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Report Title

ESTABLISHMENT OF A CENTER FOR DEVELOPMENT OF CHEMICAL SENSORS FOR EXPLOSIVES AT UNIVERSITY OF PUERTO RICO–MAYAGÜEZ

ABSTRACT

DoD-UPRM-MURI grant: “Establishment of a Center for Development of Chemical Sensors for Explosives at University of Puerto Rico – Mayaguez” (Proposal # 43567CHMUR; Agreement #: DAAD190210257) operated between 2002 and 2010. The project established a multidisciplinary research center for detection of landmine explosives, focusing on spectroscopic signatures of landmines explosives and transport in soil, contributing to real time chemical sensing of landmines. Goals included:

- * Measurement of spectroscopic signatures of landmine explosives in soil;
- * Measurement of effect of environmental variables on explosives;
- * Studies of soil-explosives interactions: Raman and IR spectroscopies
- * Model transport behavior of explosives in soils under different environmental conditions.

During the last 8 years of operation, the Center for Chemical Sensors Development (CCSD) studied the detection of high explosives and homemade explosives from near field under a microscope to far field at standoff distances. Research included synthesis and characterization of explosives: nitroaliphatic and cyclic organic peroxides. Studies also included transport of explosives in soils, both physical and mathematical modeling. The DoD sponsored research center has served to train and educate a significant number of students from BS to Ph.D. levels.

List of papers submitted or published that acknowledge ARO support during this reporting period. List the papers, including journal references, in the following categories:

(a) Papers published in peer-reviewed journals (N/A for none)

1. Espinosa-Fuentes, E.A., Peña-Quevedo, A.J., Pacheco-Londoño, L.C., Infante-Castillo, R. and Hernández-Rivera, S.P., A Review of Peroxide Based Homemade Explosives: Characterization and Detection, in "Explosive Materials: Classification, Composition and Properties", Janssen, T.J., ed., Chemical Engineering Methods and Technology Series, Nova Science Publishers, Inc. Hauppauge, NY, fourth quarter 2010, ISBN: 978-1-61761-188-9.
2. Hernández-Rivera, S.P. and Castillo-Chará, J., Ab initio, DFT calculation and vibrational analysis of 2,4,6-trinitrotoluene, 2010, *Vib. Spectrosc.* 53: 248–259.
3. Hernández-Rivera, S.P., Pacheco-Londoño, L.C., Ortiz-Rivera, W., Castro-Suarez, J.R., O.M. Primera-Pedrozo and Félix-Rivera, H., Remote Raman and Infrared Spectroscopy Detection of High Explosives, in "Explosive Materials: Classification, Composition and Properties", Janssen, T.J., ed., Chemical Engineering Methods and Technology Series, Nova Science Publishers, Inc. Hauppauge, NY, fourth quarter 2010, ISBN: 978-1-61761-188-9.
4. Pacheco-Londoño, L.C., Primera-Pedrozo, O.M., Hernández-Rivera, S.P., Evaluation of Samples and Standards of Energetic Materials on Surfaces by Grazing Angle-FTIR Spectroscopy in "Fourier Transform Infrared Spectroscopy: Developments, Techniques and Applications", Rees, O.J., ed., Chemical Engineering Methods and Technology Series, Nova Science Publishers, Inc. Hauppauge, NY, third quarter 2010, ISBN: 978-1-61668-835-6.
5. Primera-Pedrozo, O.M., Soto-Feliciano, Y.M., Pacheco-Londoño, L.C., Hernández-Rivera, S.P., Fiber Optic-Coupled Grazing Angle Probe-Fourier Transform Reflection Absorption Infrared Spectroscopy for Analysis of Energetic Materials on Surfaces, in "Fourier Transform Infrared Spectroscopy: Developments, Techniques and Applications", Rees, O.J., ed., Chemical Engineering Methods and Technology Series, Nova Science Publishers, Inc. Hauppauge, NY, third quarter 2010, ISBN: 978-1-61668-835-6.
6. Infante-Castillo, R. Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Vibrational spectra and structure of RDX and its ¹³C- and ¹⁵N-labelled derivatives: a theoretical and experimental study, 2010, *Spectrochimica Acta-A*, 76 (2) 137-141. doi:10.1016/j.saa.2010.02.051.
7. Peña-Quevedo, A.J., Laramée, J.A., Durst, H.D. and Hernández-Rivera, S.P., Cyclic Organic Peroxides Characterization by Mass Spectrometry and Raman Microscopy, *IEEE J. Sensors*, accepted, 2010.
8. Ortiz, W., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Standoff Raman Spectroscopy System for Detection of Chemical Warfare Agents Simulants and Toxic Industrial Compounds, *Sens Imaging*, 2010.
9. Ramírez-Cedeño, M.L., Félix-Rivera, H., Sánchez-Cuprill, R.A., Hernández-Rivera, S.P., Thermal-Spectroscopic Characterization of Acetone Peroxide and Acetone Peroxide Mixtures with Nitrocompounds, *J. Them. Anal. Cal.*, 2010.
10. Hernández-Rivera, S.P. and Castillo-Infante, R., A systematic theoretical investigation of the relationship between heats of detonation and NBO charges and ¹⁵N NMR chemical shifts of nitro groups in nitramines and nitro-paraffins, *Computational and Theoretical Chemistry*, 2010.
11. Félix-Rivera, H., Ramírez-Cedeño, M.L., Sánchez-Cuprill, R.A., Hernández-Rivera, S.P., Vapor Pressure and Enthalpy of Sublimation of Energetic Materials by Thermal Gravimetric Analysis, *Thermochim. Acta* 2010.
12. Wrable, M. Primera-Pedrozo, O.M., Hernández-Rivera, S.P. and Castillo-Chará, J., Interpretation of the surface-enhanced Raman spectrum of 2,4,6-trinitrotoluene using simple quantum chemistry models, *J. Undergrad. Chem. Res.* 2010.
13. Wrable-Rose, M. Primera-Pedrozo, O.M., Pacheco-Londoño, L.C. and Hernandez-Rivera, S.P., TNT, RDX and Ammonium Nitrate Standards on Gold-on-Silicon Surfaces by Thermal Inkjet Technology, *Sens Imaging*, 2010.
14. Infante-Castillo, R. Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Monitoring the $\alpha \rightarrow \beta$ solid-solid phase transition of RDX with Raman spectroscopy: a theoretical and experimental study, 2010, *J. Mol. Struct.*, 970 (1-3):51-58.
15. Rivera-Betancourt, O., Primera-Pedrozo, O.M., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., SERS and Density Functional Theory Study of o-Dinitrobenzene on Cu Nanoparticles, 2010, *IEEE J. Sensors*, 10 (3): 69-706. doi: 10.1109/JSEN.2009.2038626.
16. Ramírez, M.L., Ortiz, W., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Remote Detection of Hazardous Liquids Concealed in Glass and Plastic Containers, 2010, *IEEE J. Sensors*, 10 (3): 693-698. doi: 10.1109/JSEN.2009.2036373
17. Infante-Castillo, R., Hernández-Rivera, S.P., On the choice of optimal protocol for calculation of ¹³C and ¹⁵N NMR isotropic chemical shifts in nitramine systems, 2010, *J. Mol. Struct.: THEOCHEM*, 940 (1-3):124-128. doi:10.1016/j.theochem.2009.10.026
18. Irrazabal, M., Hernandez-Rivera, S.P., Briano, J.G., Modeling of TNT transport from landmines: Numerical approach", 2009, *Chemosphere*, 77: 546–551.
19. Primera-Pedrozo, O.M., Soto-Feliciano, Y.M., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., "Detection of High Explosives Using Reflection Absorption Infrared Spectroscopy with Fiber Coupled Grazing Angle Probe / FTIR", 2009, *Sens. Imaging*, 10 (1): 1-13.
20. Pacheco-Londoño, L.C., Ortiz-Rivera, W., Primera-Pedrozo, O.M. and Hernandez-Rivera, S.P., "Vibrational Spectroscopy Standoff Detection of Explosives", 2009, *Anal. Bioanal. Chem.*, 395:323-335. DOI 10.1007/s00216-009-2954-y.
21. Ramirez, M.L., Pacheco, L.C., Barreto M.A. and Hernández-Rivera, S.P., Enhanced Raman Detection using Spray-On Nanoparticles/Remote Sensed Raman Spectroscopy, in *Nanoscience and Nanotechnology for Chemical and Biological Defense*, R. Nagarajan, Walter Zukas, T. Alan Hatton, Stephen Lee, Eds., ACS Symposium Series # 1016, Ch. 10, pp. 131-140, Oxford University Press, New York, NY, 2009.
22. Hernández-Rivera, S.P., Briano, J.G., de la Cruz-Montoya, E., Pérez-Acosta, G.A. and Jeréz-Rozo, J.I., Enhanced Raman Scattering of

Nitroexplosives on Metal Oxides and Nanoparticles of Ag/TiO₂, in Nanoscience and Nanotechnology for Chemical and Biological Defense, R. Nagarajan, Walter Zukas, T. Alan Hatton, Stephen Lee, Ed., ACS Symposium Series # 1016, Ch. 16, pp. 205-216, Oxford University Press, New York, NY, 2009.

23. Chamoun-Emanuelli, A.M., Primera-Pedrozo, O.M., Barreto-Caban, M.A., Jerez-Rozo, J.I., and Samuel P. Hernández-Rivera, S.P., Enhanced Raman Scattering of TNT on Nanoparticles Substrates: Ag, Au and Bimetallic Au/Ag Colloidal Suspensions, in Nanoscience and Nanotechnology for Chemical and Biological Defense, R. Nagarajan, Walter Zukas, T. Alan Hatton, Stephen Lee, Eds., ACS Symposium Series # 1016, Ch. 17, pp. 217-232, Oxford University Press, New York, NY, 2009.
24. Primera-Pedrozo, O. M.; Jerez-Rozo, J. I.; De La Cruz-Montoya, E.; Luna-Pineda, T.; Pacheco-Londono, L. C.; Hernández-Rivera, S. P., "Nanotechnology-Based Detection of Explosives and Biological Agents Simulants", 2008, IEEE J. Sensors, 8(6): 963-973. Digital Object Identifier 10.1109/JSEN.2008.9239.
25. Jerez-Rozo, J.I.; Primera-Pedrozo, O.M.; Barreto-Caban, M.A.; Hernandez-Rivera, S.P., "Enhanced Raman Scattering of 2,4,6-TNT Using Metallic Colloids", 2008, IEEE J. Sensors, 8(6): 974-982. Digital Object Identifier 10.1109/JSEN.2008.923229.
26. Primera-Pedrozo, O.M., Soto-Feliciano, Y.M., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., High Explosives Mixtures Detection Using Fiber Optics Coupled: Grazing Angle Probe/Fourier Transform Reflection Absorption Infrared Spectroscopy, 2008, Sens Imaging, 9(3-4): 27-40.
27. Hernández-Rivera, S.P., Pacheco-Londoño, L.C., Primera-Pedrozo, O.M., Ruiz, O., Soto-Feliciano, Y., Ortiz, W., Vibrational Spectroscopy of Chemical Agents Simulants, Degradation Products of Chemical Agents and Toxic Industrial Compounds, 2007, International Journal of High Speed Electronics and Systems (IJHSES), 17(4): 827-843.
28. Gomez, L.M., Osorio, C., Amman, E., Hernandez, S.P. and Castro, M.E., The spectroscopic fingerprint of TNT between 395 and 495 nm determined from transmission near field optical microscopy measurements, 2006, Chem. Phys. Lett., 422, 313-316.
29. Alzate, L., Ramos, C.M., Hernández, N.M., Hernández, S.P. and Mina, N., "The Vibrational Spectroscopic Signature of TNT In Clay Minerals", 2006, Vibrational Spectroscopy, 42: 357-368.
30. Alzate, L., Ramos, C.M., Hernández, N.M., Hernández, S.P. and Mina, N., "Density Functional Theory Treatment of the Structures and Vibrational Frequencies of 2,4- and 2,6-dinitrotoluenes", 2006, J. Mol. Struct.: Theochem.
31. Torres, P., Mercado, L., Cotte, I., Hernandez, S.P., Mina, N., Santana, A., Chamberlain, R.T., Lareau, R. and Castro, M.E., 2004, "Vibrational Spectroscopy Study of □ and □ RDX Deposits", J. Phys. Chem. B, 108: 8799-8805.
32. Mercado, L., Torres, P., Gómez, L. M., Mina, N., Hernández, S. P., Lareau, R., Chamberlain, R. T. and Castro-Rosario, M.E., 2004, "Synthesis and Characterization of High-Energy Nanoparticles", J. Phys. Chem. B, 108: 12314-12317.
33. Colon, Y., Ramos, C.M., Alzate, L., Castro, M.E., Hernández, S.P., Mina, N. Chamberlain, R.T., and Lareau, R.T., "Ion Mobility Spectrometry Determination of RDX on Surfaces", 2003, Int. J. Ion Mobil. Spectrom. 6.
34. Y. Colon, C.M. Ramos, S. Rosario, M.E. Castro, S.P. Hernández, N. Mina, R.T. Chamberlain, and R. Lareau, "Ion Mobility Determination of Smokeless Powders on Surfaces", Int. J. Ion Mobil. Spectrom., 5 (2002)3: 127-131.
35. Mehta, N.K., Goenaga-Polo, J.E., Hernández-Rivera, S.P., and Hernández, D., Thomson, M.A. and Melling, P.J., "Development of an In-Situ Spectroscopic Method for Cleaning Validation Using Mid-IR Fiber Optics", 2003, Spectroscopy, April, 18 (4), 14-19.

Number of Papers published in peer-reviewed journals: 35.00

(b) Papers published in non-peer-reviewed journals or in conference proceedings (N/A for none)

1. Irrazábal, M., Hernández-Rivera, S. P., Briano, J. G., "Modeling of the transport of explosive related compounds in soil", 2009, in Detection and Sensing of Mines, Explosive Objects, and Obscured Targets XIV, edited by Russell S. Harmon, J. Thomas Broach, John H. Holloway Jr., Proc. SPIE Int. Soc. Opt. Eng., 7303: 730309-730315.
2. Peña-Quevedo, A. J., Hernández-Rivera, S. P., "Mass spectrometry analysis of hexamethylene triperoxide diamine by its decomposition products" 2009, in Detection and Sensing of Mines, Explosive Objects, and Obscured Targets XIV, edited by Russell S. Harmon, J. Thomas Broach, John H. Holloway Jr., Proc. SPIE Int. Soc. Opt. Eng., 7303, 730303-730308.
3. Hwang, S., I. Y. Padilla, I. Feliciano, and J. Falcon, Transport and distribution of TNT and DNT in the presence of surface vegetation with *Fimbristylis cymosa*, 2009, Proc. of SPIE on Detection and Sensing of Mines, Explosive Objects, and Obscured Targets XIV, Russell S. Harmon; J. Thomas Broach; John H. Holloway, Jr., Editors, Vol. 7303.
4. Anaya, A. and I. Y. Padilla, Interrelation Between Atmospheric Conditions and Detection of Explosive Relative Compounds Near Soil-Atmospheric Surfaces in Unsaturated Soil, Detection and Remediation Technologies for Mines and Minelike Targets XII, SPIE Defense and Security Symposium, Orlando, FL, April 13-17, 2009.
5. Colón, E. and I.Y. Padilla, Climate Effect On The Fate, Transport and Detection of Explosive Signatures in a Sandy Soil Field Lysimeter, in Detection and Remediation Technologies for Mines and Minelike Targets XII, SPIE Defense and Security Symposium, Orlando, FL, April 13-17, 2009.
6. Rivera, L. and I.Y. Padilla, Concentration Distribution of DNT and TNT around an Improvised Explosive Device in an Urban Environment, in Detection and Remediation Technologies for Mines and Minelike Targets XII, SPIE Defense and Security Symposium, Orlando, FL, April 13-17, 2009.
7. Rivera, R. Environmental Effects on the Fate and Transport of Explosive-Related Compounds in Heterogeneous 3-D Clayey Soil's System, in Detection and Remediation Technologies for Mines and Minelike Targets XII, SPIE Defense and Security Symposium, Orlando, FL, April 13-17, 2009.
8. Anaya, A. and I.Y. Padilla, Influence of Variable Environmental Conditions on Presence and Concentration of Energetic Chemicals Near Soil Surface in the Vadose Zone, Eos Trans. AGU, 89(53), Fall Meet. Suppl., Abstract H13A-0899, December 15-19, 2008.
9. Pacheco-Londoño, L.C., Primera-Pedrozo, O.M., Ortiz, W., Castro, M.E. and Hernández-Rivera, S.P., "Modeling of Nitro Group in Explosives: Spectroscopic Measurements and Theoretical Calculations", 2007, Proceedings of the 2007 IEEE Antennas and Propagation International Symposium, Honolulu, HI, June 10-14.
10. González, M. Peroza, C., Hernández, S.P. and Castro, M., "Nitroexplosives detection: from basic science to detection at a distance", 2007, Proceedings of the 2007 IEEE Antennas and Propagation International Symposium, Honolulu, HI, June 10-14.
11. Castillo-Chará, J., Manrique-Bastidas, C., Mina, M., Castro, M.E., Hernández-Rivera, S.P., "Ab initio calculation of Raman vibrational signatures of 2,4-dinitrotoluene, 2,6-dinitrotoluene and 2,4,6-trinitrotoluene", 2007, Chemical and Biological Sensors for Industrial and Environmental Monitoring III, Kenneth J. Ewing; James B. Gillespie; Pamela M. Chu; William J. Marinelli, Eds., Proc. SPIE Int. Soc. Opt. Eng., 6756, 67560G.
12. Luna-Pineda, T.; Soto-Feliciano, K.; De La Cruz-Montoya, E.; Pacheco-Londoño, L.C.; Ríos-Velázquez, C. and Hernández-Rivera, S.P.; "Spectroscopic characterization of biological agents using FTIR, normal Raman and Surface-Enhanced Raman spectroscopies", Chemical and Biological Sensing VIII, Augustus W. Fountain III, Editor, 2007, Proc. SPIE Int. Soc. Opt. Eng., 6554, 65540K-655410K.
13. Jerez Roza, J.I.; Chamoun, A.M.; Peña, S.L. and Hernández-Rivera, S.P.; "Enhanced Raman scattering of TNT on nanoparticle substrates: Ag colloids prepared by reduction with hydroxylamine hydrochloride and sodium citrate", Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense VI, Edward M. Carapezza, Editors, 2007, Proc. SPIE Int. Soc. Opt. Eng., 6538, 653824-653835.
14. Ruiz-Pesante, O.; Pacheco-Londoño, L.C.; Primera-Pedrozo, O.M.; Ortiz, W.; Soto-Feliciano, Y.M.; Nieves, D.E.; Ramirez, M.L. and Hernández-Rivera, S.P.; "Detection of Simulants and Degradation Products of Chemical Warfare Agents by Vibrational Spectroscopy", 2007, Chemical and Biological Sensing VIII, Augustus W. Fountain III, Editors, Proc. SPIE Int. Soc. Opt. Eng., 6554, 65540B.
15. Infante-Castillo, R. and Hernández-Rivera, S.P.; "Effects of isotopic substitution on the vibrational spectra of α -RDX", 2007, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense VI, Edward M. Carapezza, Editors, Proc. SPIE Int. Soc. Opt. Eng., 6538, 653825-653831.
16. De La Cruz-Montoya, E., Pérez-Acosta, G., Luna Pineda, T. and Hernández-Rivera, S.P.; "Surface enhanced Raman scattering of TNT and DNT on colloidal nanoparticles of Ag/TiO₂", 2007, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense VI, Edward M. Carapezza, Editors, Proc. SPIE Int. Soc. Opt. Eng., 6538, 653826-653835.
17. Peña-Luengas, S.L.; Jerez-Rozo, J.I.; Correa, S.N.; Peña, N.E. and Hernández-Rivera, S.P.; "Development of SPME-HPLC methodology for detection of nitroexplosives", 2007, Detection and Remediation Technologies for Mines and Minelike Targets XII, Russell S. Harmon; J. Thomas Broach; John H. Holloway, Jr., Editors, Proc. SPIE, Vol. 6553, 65531W-655312W.
18. Primera-Pedrozo, O.M.; Rodríguez, N.; Pacheco-Londoño, L. and Hernández-Rivera, S.P.; "Detection of 2,4,6-trinitrotoluene on non-traditional surfaces using fiber optic coupled grazing angle probe: FTIR", 2007, Infrared Technology and Applications XXXIII, Bjørn F. Andresen; Gabor F. Fulop; Paul R. Norton, Ed., Proc. SPIE Int. Soc. Opt. Eng., 6542, 65423J-654232J.
19. Ramirez, M.L.; Ortiz, W.; Ruiz, O.; Pacheco-Londoño, L. and Hernández-Rivera, S.P.; "Detection of hazardous liquids concealed in

- glass, plastic, and aluminum containers”, 2007, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense VI, Edward M. Carapezza, Editors, Proc. SPIE, Vol. 6538, 653827-653835.
20. Peña-Quevedo, A.J.; Cody, R.; Mina-Camilde, N.; Ramos M. and Hernández-Rivera, S.P.; “Characterization and differentiation of high energy amine peroxides by direct analysis in real time TOF/MS”, 2007, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense VI, Edward M. Carapezza, Editors, Proc. SPIE Int. Soc. Opt. Eng., 6538 653828-653839.
21. Pacheco-Londoño, L.; Santiago, A.; Pujols, J.; Primera-Pedrozo, O.M.; Mattei, A.; Ortiz, W.; Ruiz, O.; Ramirez, M.L. and Hernández-Rivera, S.P.; 2007, “Characterization of Layers of Tetryl, TNB and HMX on Metal Surfaces Using Fiber Optics Coupled Grazing Angle-FTIR”, Infrared Technology and Applications XXXIII, Bjørn F. Andresen; Gabor F. Fulop; Paul R. Norton, Editors, Proc. SPIE Int. Soc. Opt. Eng., 6542, 65423K-65433K.
22. Irrazábal, M.; Florián, V.; Castro, M.; Hernández-Rivera, S.P. and Briano, J.G.; “Effect of environmental parameters on the chemical signature of TNT in soil”, 2007, Detection and Remediation Technologies for Mines and Minelike Targets XII, Russell S. Harmon; J. Thomas Broach; John H. Holloway, Jr., Editors, Proc. SPIE Int. Soc. Opt. Eng., 6553, 65531N-65541N.
23. Pacheco-Londoño, L.C., Primera-Pedrozo, O.M., Ortiz, W., Castro, M.E. and Hernández-Rivera, S.P., “Modeling of Nitro Group in Explosives: Spectroscopic Measurements and Theoretical Calculations”, 2007, Proceedings of the 2007 IEEE Antennas and Propagation International Symposium, Honolulu, HI, June 10-14.
24. González, M. Peroza, C., Hernández, S.P. and Castro, M., “Nitroexplosives detection: from basic science to detection at a distance”, 2007, Proceedings of the 2007 IEEE Antennas and Propagation International Symposium, Honolulu, HI, June 10-14.
25. Castillo-Chará, J., Manrique-Bastidas, C., Mina, M., Castro, M.E., Hernández-Rivera, S.P., “Ab initio calculation of Raman vibrational signatures of 2,4-dinitrotoluene, 2,6-dinitrotoluene and 2,4,6-trinitrotoluene”, 2007, Chemical and Biological Sensors for Industrial and Environmental Monitoring III, Kenneth J. Ewing; James B. Gillespie; Pamela M. Chu; William J. Marinelli, Eds., Proc. SPIE Int. Soc. Opt. Eng., 6756, 67560G.
26. O.M. Primera-Pedrozo, Y.M. Soto-Feliciano, L.C. Pacheco-Londoño and S.P. Hernández-Rivera, “Fiber Optic Coupled-Reflection Absorption Infrared Spectroscopy (FO-RAIRS) as a Surface Analyzer of Traces Residues of Nitro Explosives on Surfaces”, Advanced Infrared Technology and Applications 9, Guanajuato, León, Mexico, October, 2007.
27. L.C. Pacheco-Londoño, O.M. Primera-Pedrozo, Y.M. Soto-Feliciano and S.P. Hernandez-Rivera, “Solvent Influence on Homogeneity of TNT Smearing Sample Preparation using Micro RAIRS Imaging”, Advanced Infrared Technology and Applications 9, Guanajuato, León, Mexico, October, 2007.
28. M. Gonzalez, S.P. Hernandez, and M.E. Castro, “X ray photoelectron spectroscopy of RDX on Si(110): Evidence for a new form of RDX”, 233rd American Chemical Society Meeting, Chicago, Illinois, March 25-29, 2007.
29. Theoretical calculations of DNT with siloxane site surface, Neiza M. Hernandez and Nairmen Mina, ACS National Meeting & Exposition, Chicago, Mach 28, 2007.
30. Density Functional Theory Treatment of the Structures and Vibrational Frequencies of 2,4- and 2,6-dinitrotoluenes, Neiza M. Hernandez and Nairmen Mina, ACS National Meeting & Exposition, Chicago, Mach 28, 2007.
31. J. I. Jeréz-Rozo, A.M. Chamoun and S.P. Hernandez-Rivera, Enhanced Raman Scattering of TNT on nanoparticles substrates: Ag and Au colloids and Au-Ag alloys, Nanoscience and Nanotechnology for Chemical and Biological Defense Symposium, 236th American Chemical Society National Meeting, Boston, MA, August, 2007.
32. T. Luna-Pineda, K. Soto-Feliciano, C. Ríos-Velázquez and S.P. Hernández-Rivera, “Surface Enhanced Raman Spectroscopy Characterization of Biological Agents”, Nanoscience and Nanotechnology for Chemical and Biological Defense Symposium, 236th American Chemical Society National Meeting, Boston, MA, August, 2007.
33. A.J. Peña-Quevedo , R.B. Cody, N. Mina-Calmide, and S.P. Hernández-Rivera, Synthesis, Characterization and Identification of Tetramethylene Diperoxide Dicarbamide by Direct Analysis Real Time –Mass Spectrometry and Vibrational Microscopy, 235th American Chemical Society Meeting, Chicago, IL, March 25-29, 2007.
34. Blanco, A., Pacheco-Londoño, L.C., Peña-Quevedo, A.J. and Hernández-Rivera, S.P., “UV Raman detection of 2,4-DNT in contact with sand particles”, 2006, Detection and Remediation Technologies for Mines and Minelike Targets XI; J. Thomas Broach, Russell S. Harmon, John H. Holloway, Jr.; Eds., Proc. SPIE Int. Soc. Opt. Eng., 6217, 621737-621746.
35. Ballesteros-Rueda, L.M., Herrera-Sandoval, G.M., Mina, N., Castro-Rosario, M.E., Briano, J.G. and Hernandez-Rivera, “Spectroscopic signatures of PETN: Part II. Detection in clay”, 2006, Detection and Remediation Technologies for Mines and Minelike Targets XI; J. Thomas Broach, Russell S. Harmon, John H. Holloway, Jr.; Eds., Proc. SPIE Int. Soc. Opt. Eng., 6217, 62173D-621712D.
36. Herrera-Sandoval, G.M., Ballesteros-Rueda, L.M., Mina-Camilde, N., Castro-Rosario, M.E., Briano, J.G. and Hernández-Rivera, S.P., “FT-IR signatures of TNT on montmorillonite-clay particles”, 2006, Detection and Remediation Technologies for Mines and Minelike Targets XI; J. Thomas Broach, Russell S. Harmon, John H. Holloway, Jr.; Eds., Proc. SPIE Int. Soc. Opt. Eng., 6217, 62173B-621713B.
37. Peroza, C.A., Osorio-Cantillo, C.M., Morales, M. Hernandez-Rivera, S.P. and Castro-Rosario, M.E., ‘Detection of TNT at a distance from analysis of backscattered radiation between 395 and 405 nm”, 2006, Detection and Remediation Technologies for Mines and Minelike Targets XI; J. Thomas Broach, Russell S. Harmon, John H. Holloway, Jr.; Eds., Proc. SPIE Int. Soc. Opt. Eng., 6217, 62171N.
38. Báez, B., Florián, V., Hernández-Rivera, S.P., Cabanzo, A. Correa, S.N., Irrazabal, M., Briano, J.G. and Castro, M.E., Detection of

- chemical signatures from TNT buried in sand at various ambient conditions: Phase II, 2006, Detection and Remediation Technologies for Mines and Minelike Targets XI; J. Thomas Broach, Russell S. Harmon, John H. Holloway, Jr.; Eds., Proc. SPIE Int. Soc. Opt. Eng., 6217, 62171M-621710M.
39. Pacheco-Londoño, L.C., Primera-Pedrozo, O.M., Ramírez, M., Ruiz, O. and Hernández-Rivera, S.P., "Standoff infrared detection of explosives at laboratory scale", 2006, Infrared Technology and Applications XXXII; Bjørn F. Andresen, Gabor F. Fulop, Paul R. Norton; Eds., Proc. SPIE Int. Soc. Opt. Eng., 6206, 620634-620641.
40. Barreto-Cabán, M.A., Pacheco-Londoño, L.C., Ramírez, M.L. and Hernández-Rivera, S.P., "Novel method for the preparation of explosive nanoparticles", 2006, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 6201, 620129-620139.
41. Soto-Feliciano, Y., Primera-Pedrozo, O.M., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., "Temperature dependence of detection limits of TNT on metallic surfaces using fiber optic coupled FTIR", 2006, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 6201, 62012H-620110H.
42. Infante-Castillo, R. and Hernández-Rivera, S.P., "Theoretical and experimental vibrational and NMR studies of RDX", 2006, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 6201, 62012F-62019F.
43. Peña-Quevedo, A.J., Mina-Calmide, N., Rodríguez, N., Nieves, D., Cody, R.B. and Hernández-Rivera, S.P., "Synthesis, characterization, and differentiation of high energy amine peroxides by MS and vibrational microscopy", 2006, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 6201, 62012E-620111E.
44. Peña-Quevedo, A.J., Figueroa, J., Rodríguez, N., Nieves, D., Hernández, N., Rivera, R., Mina, N., and Hernández-Rivera, S.P., "Effect of water and common salts on the vibrational spectra of high energy cyclic organic peroxides", 2006, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 6201, 62012D-620112D.
45. Balaguera-Gelves, M.R., El Burai-Félix, A., De La Cruz-Montoya, E., Jeréz Rozo, J.I. and Hernández-Rivera, "Silver metal colloidal film on a flexible polymer substrate", 2006, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 6201, 62012C-620110C.
46. Ramírez, M.L., Pacheco-Londoño, L.C., Peña, A.J. and Hernández-Rivera, S.P., "Characterization of peroxide-based explosives by thermal analysis", 2006, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 6201, 62012B-620111A.
47. Primera-Pedrozo, O.M., Soto-Feliciano, Y., Pacheco-Londoño, L.C., De La Torre-Quintana, L.F; and Hernández-Rivera, S.P., "Detection of explosive mixtures on surfaces using grazing angle probe - FTIR: model for classification", 2006, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 6201, 62012A-62017A.
48. De La Cruz-Montoya, E., Jeréz, J.I., Balaguera-Gelves, M., Luna-Pineda, T., Castro, M.E. and Hernández-Rivera, S.P., "Enhanced Raman spectroscopy of 2,4,6-TNT in Anatase and rutile titania nanocrystals", 2006, Optics and Photonics in Global Homeland Security II; Theodore T. Saito, Daniel Lehrfeld; Eds., Proc. SPIE Int. Soc. Opt. Eng., 6203, 62030X-62036X.
49. Jeréz Rozo, J. I., del Rocío Balaguera, M., Cabanzo, A., de la Cruz Montoya, E., Hernández-Rivera, S. P., "Enhanced Raman scattering of nitro-explosives on nanoparticles substrates: Au-Ag alloy, tin oxide, and scandium oxide" in Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V, edited by Edward M. Carapezza, 2006, Proc. SPIE Int. Soc. Opt. Eng., 6201, 62012G.
50. Núñez-Quintero, D. and Hernández-Rivera, S.P., "Spectroscopic modeling of nitro group in explosives", 2006, Independent Component Analyses, Wavelets, Unsupervised Smart Sensors, and Neural Networks IV; Harold H. Szu; Ed., Proc. SPIE Int. Soc. Opt. Eng., 6247, 62470Z-62479Z.
51. Hernández, Miguel D., Ivonne Santiago, and Ingrid Padilla, Macro-Sorption of 2,4-Dinitrotoluene onto Sandy and Clayey Soils, Paper Number: 6217-132, in Detection and Remediation Technologies for Mines and Minelike Targets XI, SPIE Defense and Security Symposium, April 17-21 2006 in Orlando, FL, 2006.
52. Padilla, Amira, Ingrid Padilla, and Ivonne Santiago, Multiphase Extraction Sampling of Explosives in Unsaturated Soils, Paper Number: 6217-139, in Detection and Remediation Technologies for Mines and Minelike Targets XI, SPIE Defense and Security Symposium, April 17-21 2006 in Orlando, FL, 2006.
53. Anaya, Angel and Ingrid Padilla, 3D Laboratory-Scale SoilBed for Assessment of Fate and Transport of Explosive-Related Compounds in Soils Under Variable Environmental Conditions, Paper Number: 6217-135, in on Detection and Remediation Technologies for Mines and Minelike Targets XI, SPIE Defense and Security Symposium, April 17-21 2006 in Orlando, FL, 2006.
54. Molina, Gloria M., Ingrid Padilla, Miguel Pando, and Diego Perez, Field Lysimeters for the Study of Fate and Transport of Explosive Chemical in Soils Under Variable Environmental Conditions, Paper Number: 6217-137, in Detection and Remediation Technologies for Mines and Minelike Targets XI, SPIE Defense and Security Symposium, April 17-21 2006 in Orlando, FL, 2006.

55. Rodríguez, Sylvia, Ingrid Padilla, and Ivonne Santiago, Development of a Multi-Scale Packing Methodology for Evaluating Fate and Transport Processes of Explosive-Related Chemicals in Soil Physical Models, Paper Number: 6217-77, in Detection and Remediation Technologies for Mines and Minelike Targets XI, SPIE Defense and Security Symposium, April 17-21 2006 in Orlando, FL, 2006.
56. S.P. Hernández-Rivera, O.M. Primera-Pedrozo, L. Pacheco-Londoño, O. Ruiz and Y. Soto-Feliciano, Standoff infrared detection of Chemical Warfare Agents Simulants and explosives at laboratory scale, 7th Joint Conference on Standoff Detection for Chemical and Biological Defense, Williamsburg, VA, October 23-27, 2006.
57. Pacheco-Londono, L., Primera-Pedrozo, O.M., de la Torre, L.F. and Hernandez-Rivera, S.P., "Determination of TATP, DNT, and TNT in air by FTIR and PLS-discriminant analysis", 2005, Optical Pattern Recognition XVI, David P. Casasent, Tien-Hsin Chao; Eds, Proc. SPIE Int. Soc. Opt. Eng., 5816: 180-185.
58. Florian, V., Cabanzo, A., Baez, B., Correa, Irrazabal, M., Briano, Castro, M.E. and Hernandez-Rivera, S.P., 2005, "Detection of the spectroscopic signatures of explosives and their degradation products", Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., Proc. SPIE Int. Soc. Opt. Eng., 5794: 724-728.
59. Manrique-Bastidas, C.A., Mina, N., Castro, M.E. and Hernandez-Rivera, S.P., "Raman microspectroscopy and FTIR crystallization studies of 2,4,6-TNT in soil", 2005, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds. Proc. SPIE Int. Soc. Opt. Eng., 5794: 1358-1365.
60. Rizo, O.L., Luna-Pineda, T., Cabanzo, A.C., Mendez, J., Hernandez-Rivera, S.P. and Castro-Rosario, M.E., "Microscopic mass transfer of TNT on soil", 2005, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., Proc. SPIE Int. Soc. Opt. Eng., 5794: 1335-1345.
61. Luna-Pineda, T., Gonzalez, L., Mendez, J., Cabanzo-Olarte, A.C., Rizo-Vivas, O.L., Hernandez-Rivera, S.P, Mina, N. and Castro-Rosario, M.E., "Studies of RDX interactions in soil", 2005, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., Proc. SPIE Int. Soc. Opt. Eng., 5794: 1329-1334.
62. Blanco, A., Mina, N., Castro, M.E., Castillo-Chara, J. and Hernandez-Rivera, S.P., "Effect of environmental conditions on the spectroscopic signature of DNT in sand", 2005, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds. Proc. SPIE Int. Soc. Opt. Eng., 5794: 1281-1289.
63. Correa, S.N., Baez, B. de Jesus Echevarria, M., Castro, M.E., Hernandez-Rivera, S.P., "Immersion mode SPME/ μ ECD/GC and TEEM-GC/MS for analysis of explosives buried in sand", 2005, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., Proc. SPIE Int. Soc. Opt. Eng., 5794: 1272-1280.
64. Baez, B., Correa, S.N. and Hernandez-Rivera, S.P., "Transport of explosives II: use of headspace-SPME/GC μ -ECD and TEEM GC/MS for detection of TNT vapors from sand buried samples", 2005, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., Proc. SPIE Int. Soc. Opt. Eng., 5794: 1263-1271.
65. Ballesteros, L.M., Herrera, G.M., Castro, M.E., Briano, J.G., Mina, N, Hernandez-Rivera, S.P., "Spectroscopic signatures of PETN in contact with sand particles", 2005, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., Proc. SPIE Int. Soc. Opt. Eng., 5794: 1254-1262.
66. Herrera-Sandoval, G.M., Ballesteros, L.M., Mina, Briano, J., Castro, M.E. and Hernandez-Rivera, S.P., "Raman signatures of TNT in contact with sand particles", 2005, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., Proc. SPIE Int. Soc. Opt. Eng., 5794: 1245-1253.
67. Alzate, L.F., Ramos, C.M., Hernandez, S.P. and Mina, N., "Ab initio treatment of the behavior of TNT in soil", 2005, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., Proc. SPIE Int. Soc. Opt. Eng., 5794: 1300-1309.
68. Ramos, C.M., Alzate, L.F., Colon, Y.M., Hernandez, S.P. and Mina, N., "Computational modeling of the adsorption of 2,4-DNT on clay", 2005, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., Proc. SPIE Int. Soc. Opt. Eng., 5794: 1290-1299.
69. Pacheco-Londoño, L., Primera, O.M., Ramírez, M., Ruiz O., and Hernandez-Rivera, S.P. 2005, "Review of the Various Analytical Techniques and Algorithms for Detection and Quantification of TATP", Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense IV; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 5778: 317-326, 2005.
70. Balaguera, M.R., de La Cruz Montoya, E., Castro, M.E., Rivera-Montalvo, L.A., Hernandez-Rivera, S.P., 2005, "Functionalization of nitroexplosives for surface-enhanced resonance Raman spectroscopy of silver colloids", Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense IV; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 5778: 327-336.
71. Primera-Pedrozo, O.M., Pacheco-Londono, L., Ruiz, O., Ramirez, M., Soto-Feliciano, Y.M., De La Torre-Quintana, L.F., Hernandez-Rivera, S.P., 2005, "Characterization of thermal inkjet technology TNT deposits by fiber optic-grazing angle probe FTIR spectroscopy", Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense IV; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 5778: 543-552.
72. Pena, A.J., Pacheco-Londono, L., Figueroa, J., Rivera-Montalvo, L.A., Roman-Velazquez, F.R. and Hernandez-Rivera, S.P., "Characterization and differentiation of high energy cyclic organic peroxides by GC/FT-IR, GC-MS, FT-IR, and Raman microscopy",

- 2005, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense IV; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 5778: 347-358.
73. De La Cruz-Montoya, E., Blanco, A., Balaguera-Gelves, M., Pacheco-Londono, L. and Hernandez-Rivera, S.P., "Surface enhanced Raman scattering of nitroexplosives on nontraditional substrates", 2005, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense IV; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 5778: 359-367.
74. Hernandez, N.M., Rosario, S.V., Hernandez, S.P. and Mina, N., "Detection and characterization of smokeless powders with ion mobility spectrometry", 2005, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense IV; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 5778: 607-616.
75. Neiza M. Hernández, Liliana Alzate, Rosangela Rivera, Samuel P. Hernández, and Nairmen Mina, Theoretical calculations of RDX with siloxane site surface, ACS National Meeting & Exposition, Washington DC, August 28, 2005.
76. Yleana M. Colon, Rosangela Rivera, Neisa M. Hernández, Liliana Alzate, Samuel P. Hernández, and Nairmen Mina, Detection and characterization of smokeless powders with ion mobility spectrometry. ACS National Meeting & Exposition, Washington DC, August 28, 2005.
77. Liliana F. Alzate, Rosángela Rivera, Neiza M. Hernandez, Samuel P. Hernandez, and Nairmen Mina, The Vibrational Spectroscopic Signature of TNT in Clay Minerals 3rd International Conference on Advance Vibrational Spectroscopy (ICAVS) Delavan, WI. September 13-20, 2005.
78. Primera-Pedrozo, O.M., Pacheco-Londono, L.C., De la Torre-Quintana, L.F., Hernandez-Rivera, S.P., Chamberlain, R.T., Lareau, R.T., "Use of fiber optic coupled FT-IR in detection of explosives on surfaces", 2004, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense III; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 5403: 237-245.
79. Nieto, S., Santana, A., Hernandez-Rivera, S.P., Lareau, R.T., Chamberlain, R.T. and Castro-Rosario, M.E., "Quantum dots for detection of trace amount of nonvolatile explosives: the effect of TNT in the fluorescence of CdSe quantum dots", 2004, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense III; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 5403: 256-260.
80. Pacheco-Londono, L.C., De la Torre-Quintana, L.F., Primera-Pedrozo, O.M., Herrera, G.M., Ballesteros, L.M. and Hernandez-Rivera, S.P., "Molecular parameters and reactivity responsible for properties of nitro explosives", 2004, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense III; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 5403: 269-278.
81. Pacheco-Londono, L.C., Pena, L.C., Primera-Pedrozo, O.M., Hernandez-Rivera, S.P., Mina, N., Garcia, Chamberlain, R.T. and Lareau, R.T., "An experimental and theoretical study of the synthesis and vibrational spectroscopy of triacetone triperoxide (TATP)", 2004, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense III; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 5403: 279-287.
82. Torres, P.M., Gomez, L.M., Hernandez-Rivera, S.P., Lareau, R.T., Chamberlain, R.T., and Castro-Rosario, M.E., "Synthesis and characterization of high-energy nanoparticles", 2004, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense III; Edward M. Carapezza; Ed., Proc. SPIE Int. Soc. Opt. Eng., 5403: 288-296.
83. Gomez, L.M., Santana, A., Hernandez-Rivera, S.P., and Castro, M.E., "Imaging and characterization of aerosol-deposited TNT nanoparticles: a near-field optical microscopy study", 2004, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., Proc. SPIE Int. Soc. Opt. Eng., 5415: 468-473.
84. Hernandez-Rivera, S.P., Manrique-Bastidas, C.A., Blanco, A., Primera, O.M., Pacheco, L.C., Castillo-Chara, J., Castro, M.E., and Mina, N., "Spectroscopic characterization of nitroaromatic landmine signature explosives", 2004, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., Proc. SPIE Int. Soc. Opt. Eng., 5415: 474-485.
85. Gomez, L.M. Santana, A., Mina, N., Hernández-Rivera, S.P., Castro, M.E., "Femtosecond laser UV photochemistry of TNT deposits: the role of hydroxyls", 2004, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., Proc. SPIE Int. Soc. Opt. Eng., 5415: 486-493.
86. Baez, B., Correa, S.N., Hernández-Rivera, S.P., de Jesus, M., Castro, M.E., Mina, N., Briano, J.G., "Transport of explosives I: TNT in soil and its equilibrium vapor", 2004, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., Proc. SPIE Int. Soc. Opt. Eng., 5415: 1389-1399.
87. Borrero, E.E., Briano, J.G., Castro, M.E. and Hernandez-Rivera, S.P. "Numerical simulation of the chemical-signature-compounds transport from a mine field", 2004, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., Proc. SPIE Int. Soc. Opt. Eng., 5415: 533-544.
88. Manrique-Bastidas, C.A., Castillo-Chará, J. Mina, N., Castro, M.E. and Hernández-Rivera, S.P., "Nucleation and crystallization studies: A vibrational spectroscopy investigation of 2,4,6-TNT", 2004, Detection and Remediation Technologies for Mines and Minelike Targets IX; Russell S. Harmon, J. Thomas Broach and John H. Holloway, Jr., Eds., Proc. SPIE Int. Soc. Opt. Eng., 5415: 1345-1356.

89. Blanco, A., Mina, N., Castro, M.E., Castillo-Chara, J. and Hernandez-Rivera, S.P., "Spectroscopic investigation of the spectroscopic signatures of 2,4-DNT and 2,6-DNT: their interactions with sand particles", 2004, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., Proc. SPIE Int. Soc. Opt. Eng., 5415: 1357-1366.
90. Alzate, L.F., Colon, Y.M., Ramos, C.M., Santana, A., Hernández-Rivera, S.P., Castro, M.E., Briano, J.G., and Mina, N., "Density-functional-theory calculations of TNT and its interaction with siloxane sites of clay minerals", 2004, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., Proc. SPIE Int. Soc. Opt. Eng., 5415: 1367-1376.
91. Ramos, C.M., Alzate, L.F., Colon, Y.M., Santana, A., Hernandez-Rivera, S.P., Castro, M.E., Briano, J.G., and Mina, N., "Theoretical studies of the molecular structures of dinitrotoluenes and their interactions with siloxane site surface of clays", 2004, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., Proc. SPIE Int. Soc. Opt. Eng., 5415: 1377-1388.
92. Nieto, S., Gomez, L.M., Santana, A., Briano, J.G., Mina, N., Hernandez-Rivera, S.P. and Castro, M.E., "The chemistry of TNT on clean and hydroxyl-precured Ottawa sand particles", 2004, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., Proc. SPIE Int. Soc. Opt. Eng., 5415: 1400-1407.
93. Colon, Y.M., Alzate, L.F., Ramos, C.M., Santana, A., Hernandez-Rivera, S.P., Miguel E. Castro, M.E., Munoz, M. and Mina, N., "Adsorption of RDX on clay", 2004, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., Proc. SPIE Int. Soc. Opt. Eng., 5415: 1419-1430.
94. Pacheco-Londoño, L.C. Primera-Pedrozo, O.M. and Hernández-Rivera, S.P., "Experimental and theoretical model of reactivity and vibrational detection modes of triacetone triperoxide (TATP) and homologues", 2004, Optically Based Biological and Chemical Sensing for Defense, John C. Carrano and Arturas Zukauskas, Eds., Proc. SPIE Int. Soc. Opt. Eng., 5617: 190-201.
95. Manrique-Bastidas C.A., Primera-Pedrozo, O.M. Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., "Raman Microspectroscopy Crystallization Studies of 2,4,6-TNT in Different Solvents", 2004, Optically Based Biological and Chemical Sensing for Defense, John C. Carrano and Arturas Zukauskas, Eds., Proc. SPIE Int. Soc. Opt. Eng., 5617: 429-441.
96. Nieto, S., Santana, A., Delgado, R., Hernandez, S.P., Chamberlain, R.T., Lareau, R., and Castro, M.E., "Nanoscaled Science and Engineering for Sensing: Quantum Dots Fluorescence Quenching for Organic NO₂ Sensing", 2004, Nanotech, Vol. 3, Chapter 8, Nanoparticles and Molecules, 3(8): 399-401.
97. Alzate, L.F., Ramos, C.M., Colón Y.M., Santana, A., Castillo, J., Hernández-Rivera, S.P., Castro, M.E., and Mina, N., "DFT calculations of TNT and its interaction with siloxane sites of clay minerals", 227th American Chemical Society Meeting, Anaheim, CA, March, 2004.
98. Ramos, C.M., Alzate, L.F., Colón Y.M., Santana, A., Castillo, J., Hernández-Rivera, S.P., Castro, M.E., and Mina, N., "DFT calculations of dinitrotoluenes and their interactions with soil", 227th American Chemical Society Meeting, Anaheim, CA, March, 2004.
99. Blanco, A., Mina, N., Castro, M.E., Castillo-Chara, J. and Hernández-Rivera, S.P., "Vibrational Micro-Raman measurements of 2,4-DNT and 2,6-DNT and their interactions with sand particles", 227th American Chemical Society Meeting, Anaheim, CA, March, 2004.
100. Manrique, C., Hernández, S.P., Castillo, J., Castro, M.E., Santana, A. and Mina, N., "Morphological and spectroscopic study of crystallization of TNT on metallic surfaces and in soil", 227th American Chemical Society Meeting, Anaheim, CA, March, 2004.
101. Primera, O.M., Pacheco- Londoño, L.C., De la Torre, L.F., Hernández-Rivera, S.P., Chamberlain, R.T. and Lareau, R.T., "A novel method for the detection of triacetone triperoxide (TATP) on surfaces using Fiber Optic Coupled – FTIR", 227th American Chemical Society Meeting, Anaheim, CA, March, 2004.
102. Gomez, L.M., Santana, A., Hernandez, S.P. and Castro, M.E., "One color femtosecond laser photochemistry of 2,4,6-Trinitrotoluene", Division of Physical Chemistry, 227th American Chemical Society Meeting, Anaheim, CA, March, 2004.
103. Nieto, S., Santana, A., Hernandez, S.P., Lareau, R.T., Chamberlain, R.T. and Castro, M.E., "The effect of nitro-organics in the fluorescence of dispersed colloidal particles: Off resonance femtosecond laser excitation of quantum dots as a tool for TNT detection", Division of Colloid and Surface Chemistry, 227th American Chemical Society Meeting, Anaheim, CA, March, 2004.
104. Hernández-Rivera, S.P., Castro, M.E. and Mina, N., "Chemical Point Detection and Identification Using Vibrational Spectroscopy", 2nd Joint Conference on Point Detection for Chemical and Biological Defense, Williamsburg, VA, March 1-5, 2004.
105. Borrero, E., Hernández, S.P., Castro, M.E. and Briano, J.G., "Transport of the chemical signature of buried UXO", 10th UXO Countermines Forum, St. Louis, MO, March, 2004.
106. Castro, M., "Quantum dots for trace explosive detection: the effect of TNT in the fluorescence of CdSe quantum dots", 3rd Micro Sensor Workshop, Arizona State University, Kerr Center, AZ, April 19-22, 2004.
107. Torres, P.M., Mercado, L., Cotte, I., Mina, N., Hernandez, S.P., Lareau, R., Chamberlain, R.T. and Castro-Rosario, M.E., "The role of nanoparticles in beta RDX deposits", 225th ACS National Meeting, New Orleans, Louisiana, March 2004.
108. Blanco, A., Castillo, J., Mina, J., Castro, M.E., Hernandez, S.P., "Vibrational Micro Raman measurements of 2,4-DNT and 2,6-DNT and their interactions with sand particles" 227th ACS National Meeting , Anaheim California, March 28 – April 2, 2004.
109. Gomez, L.M., Hernandez, S.P., Mina, N., Santana, A., Lapointe, A., Grossman, S., Castro, M.E., "One color femtosecond laser photochemistry of 2,4,6 trinitrotoluene", 227th ACS National Meeting , Anaheim California, March 28 – April 2, 2004.
110. Alzate, L.F., Ramos, C.M., Colón, Y.M., Santana, A., Castillo, J., Hernández-Rivera, S.P., Castro, M. E., and Mina, N., "DFT

Calculations of TNT and its Interaction with Siloxane Sites of Clay Minerals”, 227th ACS National Meeting , Anaheim California, March 28 – April 2, 2004.

111. Ramos, C.M., Alzate, L.F., Colón, Y.M., Santana, A., Castillo, J., Hernández-Rivera, S.P., Castro, M. E., and Mina, N., “DFT Calculations of Dinitrotoluenes and Their Interactions with Soil”, 227th ACS National Meeting , Anaheim California, March 28 – April 2, 2004.

112. Mina, N., Cotte, I., Colon, Y., Ramos, C.M., Alzate, L.F., Hernandez-Rivera, S.P., Castro, M.E., Chamberlain, R.T. and Lareau, R.T., “Chemical spectroscopic signature for RDX-soil interactions”, 2003, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., Proc. SPIE Int. Soc. Opt. Eng., 5089: 1363-1374.

113. Torres, P., Mercado, L., Mortimer, L., Mina, N., Hernandez-Rivera, S.P., Lareau, R.T. Chamberlain, R.T., and Castro, M.E., “Raman and scanning electron microscopy measurements of RDX on glass substrates”, 2003, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., Proc. SPIE Int. Soc. Opt. Eng., 5089: 1054-1064.

114. Correa, S.N., de Jesus, M. Mina, N., Castro, M.E., Blanco, A., Hernandez-Rivera, S.P., Cody, R. and Laramée, J. “Improved Detection of Landmine Components: Using TEEM-GC-MS for Detection of TNT and RDX in Soil and Other Complex Matrices”, 2003, Detection and Remediation Technologies for Mines and Minelike Targets VIII, Russell S. Harmon, John Holloway Jr. and J.T. Broach, Editors, Proc. SPIE Int. Soc. Opt. Eng., 5089: 1001-1009.

115. Correa, S.N., De Jesús, M., Mina, N., Castro, M.E., Blanco, A., Hernández-Rivera, S.P., Cody, R.B., and Laramée, J.A. “Comparison of SPME GC/MSD with SPME-TEEM-GC/MS in Analysis of Explosives in Complex Matrices”, 2003, 226th American Chemical Society Meeting , Symposium Papers Presented Before the Division of Environmental Chemistry Division, American Chemical Society, 43: 2, New York, N.Y.

116. Gomez, L.M., Hernandez, S.P., Mina, N. and Castro, M.E., “Synthesis and Characterization of Monodispersed 300 nm RDX Nanoparticle”, 226 th ACS National Meeting, September 7-11, 2003.

117. Perla M. Torres, N. Mina, Samuel P. Hernandez, Miguel E. Castro, Richard Lareau, and R.Thomas Chamberlain, “Nanoexplosives: The role of nanoparticles in beta RDX polymorphs”, American Chemical Society, 225 th ACS National Meeting, New Orleans, LA, March 23-27, 2003.

118. S.P. Hernandez-Rivera, “Use of in-situ Spectroscopic Method for Cleaning Validation Using Mid-IR Fiber Optics/FT-IR Probes to Significantly Decrease Cycle Times”, Implementation of Process Analytical Technologies in the pharmaceutical and biotech industries, Washington, DC, Feb. 2003.

119. I. Cotte, Y. Colon, S.P. Hernandez, M.E. Castro and N. Mina, “FT-IR AND Raman Spectroscopy Studies Of RDX-Surfaces Interactions And IMS Recovery Efficiency”, 224 th ACS National Meeting, Boston, MA August 2002.

Number of Papers published in non peer-reviewed journals: 119.00

(c) Presentations

1. Castro-Suarez, J.R., Pacheco-Londoño, L.C., Hernandez-Rivera, S.P., Diem, M. and Vélez, M., Standoff Detection of Explosives using FTIR Telescope, 2010 International Symposium on Spectral Sensing Research (ISSSR) Conference, University Plaza, Hotel & Convention Center, Springfield, MO, June 21-24, 2010.
2. Rivera-Betancourt, O.E., Arroyo-Oquendo, A., Hernandez-Gonzalez, J. and Hernández-Rivera, S.P., Employing Laser Treatment to Study Structural Effects of Bimetallic Particles and Potential Applications in SERS Detection of High Explosives, 2010 International Symposium on Spectral Sensing Research (ISSSR) Conference, University Plaza, Hotel & Convention Center, Springfield, MO, June 21-24, 2010.
3. Nieves-Colon, G.A., Pacheco-Londono, L.C., Primera-Pedrozo, O.M. and Hernández-Rivera, S.P., Quantification of TNT, DNT and PETN on Glass Substrate by Fiber Optic-Grazing Angle Probe FTIR Spectroscopy, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, 2010.
4. Rodríguez-González, G.M., Martínez-García, M., Félix-Rivera, H., Soto-Feliciano, K., Primera-Pedrozo, O.M. and Hernández-Rivera, S.P., Bacillus thuringiensis Detection and Characterization by Normal Raman and SERS at the Stationary Growth Stage, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, 2010.
5. Herrera-Sandoval, G.M., Marrero L., Vega, V. and Hernández-Rivera, S.P., SERS Effect of Silver Nanoparticles obtained by Laser Ablation, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, 2010.
6. Lasanta-Pagán, K., Espinosa, E., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Novel Synthesis of DADP, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, 2010.
7. Balaguera-Gelves, M.R. and Hernández-Rivera, S.P., Low Temperature Aqueous Synthesis of ZnO Nanorods for Enhanced Raman Spectroscopy, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, 2010.
8. Wrable-Rose, M., Primera-Pedrozo, O.M., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Preparation of Energetic Materials Standards, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, 2010.
9. Granda-Paz, N. Granda-Marulanda, L. and Hernández-Rivera, S.P., Kinetics of the degradation of aqueous TNT solutions using metallic iron nanoparticles, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, 2010.
10. Rivera-Betancourt, O.E. and Hernández-Rivera, S.P., Employing Pulsed Laser Treatment to Study Structural Effects of Bimetallic Au/Cu Particles and Potential Applications in SERS, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, 2010.
11. Gonzalez-Sosa, R., Ortiz Rivera, W. and Hernández-Rivera, S.P., Surface Enhanced Raman Spectroscopy of Yeast as Model for Biological Threats Detection, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, 2010.
12. Sanchez-Cuprill, R., Félix-Rivera, H., Ramirez-Cedeño, M.L. and Hernández-Rivera, S.P., Thermal Gravimetric Analysis for Vapor Pressure and Sublimation Enthalpy of Acetone Peroxide and other Energetic Materials, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, 2010.
13. Rivera, J.K., Soto, N.M., Corera, S.N. and Hernández-Rivera, S.P., Using Caribbean Plants for Remediation of TNT in Aqueous Medium, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, 2010.
14. Nieves-Colon, G.A., Pacheco-Londono, L.C., Primera-Pedrozo, O.M. and Hernández-Rivera S.P., Quantification of TNT, DNT and PETN on Glass Substrate by Fiber Optic-Grazing Angle Probe FTIR Spectroscopy, 30th Puerto Rico Interdisciplinary Scientific Meeting, 45th Junior Technical Meeting, University of Puerto Rico-Rio Piedras Campus, Saturday March, 2010.
15. Espinosa-Fuentes, E.A., Hidalgo-Rivera, M., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Experimental and DFT Study of the Mechanism of Acetone-Peroxide Formation Reaction, XV Sigma Xi Student Poster Day, Lobby, Chemistry Building, University of Puerto Rico at Mayagüez, Thursday, April 8th, 2010.
16. Wrable-Rose, M.R., Primera-Pedrozo, O.M., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P. Preparation of TNT and RDX Standards by Smearing and Thermal Inkjet Technologies on Gold-on-Silicon and Glass Surfaces, XV Sigma Xi Student Poster Day, Lobby, Chemistry Building, University of Puerto Rico at Mayagüez, Thursday, April 8th, 2010.
17. Rivera-Betancourt, O.E., Arroyo-Oquendo, A., Hernandez-Gonzalez, J. and Hernández-Rivera, S.P., Employing Laser Treatment to Study Structural Effects of Bimetallic Particles and Potential Applications in SERS Detection of High Explosives, XV Sigma Xi Student Poster Day, Lobby, Chemistry Building, University of Puerto Rico at Mayagüez, Thursday, April 8th, 2010.
18. Marrero-Vilches, L., Herrera-Sandoval, G.M. Vega, V. and Hernández-Rivera, S.P., Photodegradation of Explosives with Iron Oxide as Catalyst, 30th Puerto Rico Interdisciplinary Scientific Meeting, 45th Junior Technical Meeting, University of Puerto Rico-Rio Piedras Campus, Saturday March, 2010.
19. Ruiz-Caballero, J.L., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Solvation Models of RDX in Alcohols, XXXV Congress of Theoretical Chemists of Latin Expression, QUITEL 2009, San Andrés Island, Colombia, September 17-19, 2009.
20. Pacheco-Londoño, L.C., Ruiz-Caballero, J.L. and Hernández-Rivera, S.P., Theoretical Calculation of Raman Resonances and Pre-Resonances for Diatomic Molecules, XXXV Congress of Theoretical Chemists of Latin Expression, QUITEL 2009, San Andrés Island, Colombia, September 17-19, 2009.
21. Primera-Pedrozo, O.M., Chamoun-Emanueli, A.M., Medina-Ramos, W., Rivera, A. and Hernandez-Rivera, S.P., Synthesis and

- Assembly of Short and Long Gold Nanorods for Nitroexplosives Detection: A Surface Enhanced Raman Spectroscopy Study, Nanoelectronic Devices for Defense and Security Conference (NANO-DDS), Fort Lauderdale, Florida, September 27 – October 2, 2009.
22. Balaguera-Gelves, M.R., Perales-Pérez, O., Tomar, M. and Hernández-Rivera, S.P., Low-Temperature Aqueous Synthesis of ZnO Nanorods and ZnO (Au, Al, Ag) Nanocomposites for Enhanced Raman Spectroscopy, Nanoelectronic Devices for Defense and Security Conference (NANO-DDS), Fort Lauderdale, Florida, September 27 – October 2, 2009.
23. Rivera-Betancourt, O.E., Martínez, R.I., Resto, O. and Hernández-Rivera, S.P., Synthesis of Gold Covered Copper Particles by Chemical and Laser Reduction Techniques and Applications to Surface Enhanced Raman Spectroscopy (SERS), Nanoelectronic Devices for Defense and Security Conference (NANO-DDS), Fort Lauderdale, Florida, September 27 – October 2, 2009.
24. Souto-Melgar, N., Pacheco-Londoño, L.C., Souto-Bachiller, F.A., Hernández-Rivera, S.P. and Briano, J.G., Surface Enhanced Raman Scattering of TNT Via TiO₂ Au Nanocomposites, Nanoelectronic Devices for Defense and Security Conference (NANO-DDS), Fort Lauderdale, Florida, September 27 – October 2, 2009.
25. Félix, H., Ramírez, M.L. and Hernández-Rivera, S.P., Thermal-Spectroscopic Characterization of Acetone Peroxide Mixtures with Nitroexplosives, 10th annual Gordon-CenSSIS/ALERT Research & Industrial Collaboration Conference (RICC), Northeastern University in Boston, MA, October 27-28, 2009.
26. Pacheco-Londoño, L.C., Ramírez, M.L., Infante-Castillo, R., Primera-Pedrozo, O.M. and Hernández-Rivera, S.P., Sublimation Kinetics of 2,4-DNT, TATP, TNT and RDX by Grazing Angle Probe, Fiber Optic Coupled FTIR Spectroscopy and Thermal Gravimetric Analysis, 10th annual Gordon-CenSSIS/ALERT Research & Industrial Collaboration Conference (RICC), Northeastern University in Boston, MA, October 27-28, 2009.
27. Félix, H., Rodríguez, G., Martínez, R., Primera, O.M., Ríos, C. and Hernández-Rivera, S.P., Bacillus Thuringensis Detection and Characterization by Normal Raman at Different Grow Stages, 10th annual Gordon-CenSSIS/ALERT Research & Industrial Collaboration Conference (RICC), Northeastern University in Boston, MA, October 27-28, 2009.
28. Sabine, L.M., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Induced Growth of Au and Ag Nanostructures by Laser Beams for Detection of Target Analytes, 10th annual Gordon-CenSSIS/ALERT Research & Industrial Collaboration Conference (RICC), Northeastern University in Boston, MA, October 27-28, 2009.
29. Gaensbauer, N., Rivera-Betancourt, O.E., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Raman Based Detection of Hazardous Liquids Concealed in Liquid Consumer Products, 10th annual Gordon-CenSSIS/ALERT Research & Industrial Collaboration Conference (RICC), Northeastern University in Boston, MA, October 27-28, 2009.
30. Rivera-Betancourt, O.E., Martínez, Oscar Resto, O. and Hernandez-Rivera, S.P., Synthesis of Gold Covered Copper Particles by Chemical and Laser Reduction Techniques and Applications to Surface Enhanced Raman Spectroscopy, 10th annual Gordon-CenSSIS/ALERT Research & Industrial Collaboration Conference (RICC), Northeastern University in Boston, MA, October 27-28, 2009.
31. Primera-Pedrozo, O.M., Souto-Melgar, N., Chamoun-Emanuelli, A., Resto, Briano, J.G., Souto, F.A. and Hernandez-Rivera, S.P., Toward the Synthesis of New Surface Enhanced Raman Spectroscopy Substrates for Nitroexplosives Detection, 10th annual Gordon-CenSSIS/ALERT Research & Industrial Collaboration Conference (RICC), Northeastern University in Boston, MA, October 27-28, 2009.
32. Castañer de Choudens, J., Herrera, G.M. and Hernández-Rivera, S.P., Synthesis of iron oxide and study of photocatalytic activity. Northeast Alliance for graduate Education and the Professoriate, NEA Science Day – Mayaguez, Puerto Rico – March 12, 2009.
33. Hidalgo-Santiago M., Eduardo Espinosa-Fuentes, Leonardo Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Experimental and Theoretical Study of the Mechanism of Acetone-Peroxide Reaction using Raman Spectroscopy, Synthesis of iron oxide and study of photocatalytic activity, Northeast Alliance for graduate Education and the Professoriate, NEA Science Day – Mayaguez, Puerto Rico – March 12, 2009.
34. Granda-Marulanda, L., Granda-Paz, N. and Hernández, S.P., Evaluation of Adsorption Capacity of Treated Tire Rubber for TNT Removal, Northeast Alliance for graduate Education and the Professoriate, NEA Science Day – Mayaguez, Puerto Rico – March 12, 2009.
35. Vega, V., Báez, B., Herrera, G.M. and Hernández-Rivera, S.P., Titanium Dioxide Modified Expanded Polystyrene for Removal of Persistent Contaminants, Northeast Alliance for graduate Education and the Professoriate, NEA Science Day – Mayaguez, Puerto Rico – March 12, 2009.
36. Lasanta-Pagán, K.Y., Nieves-Colón, G., Ramírez, M.L., Pacheco-Londoño L.C. and Hernández-Rivera, S.P., Detection of Chemical and Biological threats Concealed in Commonly Consumed Products using Fiber Coupled Raman Spectroscopy, Northeast Alliance for graduate Education and the Professoriate, NEA Science Day – Mayaguez, Puerto Rico – March 12, 2009.
37. Álvarez, E.L., Correa, S.N., Barreto, E.S., Souto, F. and Hernández-Rivera, S.P., Removal of TNT from liquid medium using different plants, Northeast Alliance for graduate Education and the Professoriate, NEA Science Day – Mayaguez, Puerto Rico – March 12, 2009.
38. Félix-Rivera, H., Pacheco-Londoño, L.C., Ortiz-Rivera, W., Espinoza-Fuentes, E. and Hernández-Rivera, S.P., Gas Phase Remote Detection of Explosives using Nano-CARS, Northeast Alliance for graduate Education and the Professoriate, NEA Science Day – Mayaguez, Puerto Rico – March 12, 2009.
39. Ramírez, M.L., Pacheco-Londoño, L.C., Primera-Pedrozo, O.M. Ortiz, W., Ruiz, O. and Hernandez-Rivera, S.P., Application of Vibrational Spectroscopy to Detection of Chemical Warfare Agents and Related Chemicals, Third Annual U.S. Department of Homeland

Security (DHS) Annual University Network Summit, Washington, DC, March, 2009.

40. Félix, H., Ramírez, M.L., Pacheco-Londoño, L.C., Primera-Pedrozo, O.M. and Hernandez-Rivera, S.P., Implementation of Sensor Evaluation Activity for Explosive Detection Course, Third Annual U.S. Department of Homeland Security (DHS) Annual University Network Summit, Washington, DC, March, 2009.
41. Rivera-Betancourt, O.E., Primera-Pedrozo, O.M. Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Educational Perspective: Use of Surface Enhanced Raman Spectroscopy (SERS) For the Detection of Explosives and Threat Agents, Third Annual U.S. Department of Homeland Security (DHS) Annual University Network Summit, Washington, DC, March, 2009.
42. Ruiz-Pesante, O., Ortiz, W. and Hernández-Rivera, S.P., Detection of Chemical Warfare Agent Simulants (CWAS) and Degradation Products of Chemical Agents using Raman Spectroscopy, Third Annual U.S. Department of Homeland Security (DHS) Annual University Network Summit, Washington, DC, March, 2009.
43. Primera-Pedrozo, O.M., Chamoun-Emanuelli, A.M., Rivera-Betancourt, O.E., Pacheco-Londoño, L.C., Fierro, P.M. and Hernández-Rivera, Nanotechnology and Surface Enhanced Raman Spectroscopy (SERS): Powerful Forms to Detect Explosives, Third Annual U.S. Department of Homeland Security (DHS) Annual University Network Summit, Washington, DC, March, 2009.
44. Caraballo, Cynthia, Ingrid Padilla, Rafael Rivera, Jose A. Santiago, Environmental Monitoring of energetic chemicals in water and soils, AIChE Annual Meeting, Philadelphia, PA, November 16-21, 2008.
45. S.P. Hernández-Rivera, Undergraduate Students and Graduate Students, "Center for Chemical Sensors: Overview of Program", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
46. A.J. Peña-Quevedo, Robert B. Cody, James Laramee, Michael Nilles, Dupont Durst, Samuel P. Hernández-Rivera, Novel methodology for energetic organic peroxides analysis: Direct analysis in real time-TOF- MS, ISSSR 2008, Hoboken, NJ, June 2008.
47. O.E. Rivera-Betancourt, E. Espinosa and S.P. Hernández-Rivera, "Raman scattering study of o-and p-dinitrobenzenes on the surface of Cu nanoparticles with visible excitation and Density Functional Theory", ISSSR 2008, Hoboken, NJ, June 2008.
48. L.C. Pacheco-Londoño, W. Ortiz, O.M. Primera-Pedrozo and S.P. Hernández-Rivera, Standoff Raman Detection of Explosives, ISSSR 2008, Hoboken, NJ, June, 2008.
49. M.L. Ramirez, W Ortiz, L.C. Pacheco-Londoño and S.P. Hernández-Rivera, Remote Detection of Hazardous Liquids Concealed in Glass and Plastic Containers, ISSSR 2008, Hoboken, NJ, June 2008.
50. W.Ortiz-Rivera, L.C. Pacheco-Londoño and S.P. Hernández-Rivera, Standoff Raman Spectroscopy System for Detection of Explosives, Chemical Warfare Agents Simulants and Toxic Industrial Compounds, ISSSR 2008, Hoboken, NJ, June, 2008.
51. A.J. Peña-Quevedo, R.B. Cody, S.P. Hernández-Rivera, "Mass Spectrometry Analysis of Dibenzoyl Peroxide by DART-TOFMS", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
52. L.C. Pacheco-Londoño, W. Ortiz-Rivera, O.M. Primera-Pedrozo and S.P. Hernández-Rivera, "Remote Raman Detection and Quantification of RDX Particles in C4 by Chemometrics using Three Different Excitation Lines", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
53. O.E. Rivera-Betancourt, R. Martínez-García, O.M. Primera-Pedrozo, Leonardo C. Pacheco-Londoño and Samuel P. Hernández-Rivera, "SERS and Density Functional Theory Study of o-Dinitrobenzene on Cu Nanoparticles", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
54. S. Soto-Medina, L.C. Pacheco-Londoño and S.P. Hernández-Rivera, "Synthesis of Nanoparticles Ag-Au, Ag-Ag₂S-Au and Ag-Au₂S-Au", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
55. W. Medina-Ramos, A.M. Chamoun-Emanuelli, O.M. Primera-Pedrozo, A. Rivera, L.F. De La Torre-Quintana, and S.P. Hernández-Rivera, "Self Assembly of Gold Nanorods at the Cyclohexane/Water Interface for TNT Detection", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
56. W. Ortiz-Rivera, Leonardo C. Pacheco-Londoño and S.P. Hernández-Rivera, "Remote Raman System for Detection of Chemical Warfare Agents Simulants and Toxic Industrial Compounds", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
57. R. Infante-Castillo and S.P. Hernández-Rivera, "13C and 15N NMR Chemical Shifts Calculations on Nitramine Systems: A Comparison of Methods and Basis Sets", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
58. A.J. Peña-Quevedo and S. P. Hernández-Rivera, "Trace Identification of HMTD by API-TOF-MS", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
59. A. Rivera-Velez, O.M. Primera-Pedrozo, M. Mulhern and S.P. Hernández-Rivera, "Synthesis of Gold Nanocubes for detection of DNA molecules using Surface-Enhanced Raman Spectroscopy (SERS) Applications", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
60. A.M. Chamoun-Emanuelli, W. Medina-Ramos, A. Rivera, O.M. Primera-Pedrozo and S.P. Hernández-Rivera, "Self Assembly of Gold Nanorods at a Cyclohexane/Water interface for 2,4,6-TNT Detection", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
61. D.B. Báez, G. Rodríguez, M. Vega and S.P. Hernández-Rivera, "Recycling of Expanded Polystyrene to Remove Organic Pollutants from Water", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
62. G.M. Herrera and S.P. Hernández-Rivera, "Study of SERS Effect of Iron Oxide and its Photocatalytic Activity with Ortho-Nitrophenol

- as Contaminant”, 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
63. J.L. Ruiz-Caballero, L.C. Pacheco and S.P. Hernández-Rivera, “Solubility Determination and Theoretical Modeling of RDX in Different Alcohols”, 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
64. M.R. Balaguera-Gelves, I.J. Rodríguez, O. Perales-Perez, M. Tomar and S.P. Hernandez-Rivera, “Low-temperature aqueous synthesis of ZnO micro-rods and ZnO- Au nanocomposites”, 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
65. N. Granda-Paz, L. Granda-Marulanda and S.P. Hernández-Rivera, “Adsorption of 2,4,6-Trinitrotoluene from Aqueous Solutions using a Char Obtained from Pyrolyzed Waste-Tire Rubber”, 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
66. R. Infante-Castillo and S.P. Hernández-Rivera, “Applicability of ATR-FTIR and Optical Density to the Study of Media-Ink Interaction in Inkjet Printing”, 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
67. S.L. Peña, M. Vega and S. P. Hernández-Rivera, “Detection of explosives by Liquid Chromatography”, 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
68. S.N. Correa, E.L. Alvarez, E.S. Barreto, F. Souto-Bachiller and S.P. Hernandez-Rivera, “Comparison of TNT Removal from Aqueous Medium Using Different Plants”, 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
69. L.C. Pacheco-Londoño, O.M. Primera-Pedrozo, M.L. Ramírez, W. Ortiz and S.P. Hernández-Rivera, “Standoff Vibrational Detection and Their Figures of Merit”, ALERT-DHS-COE Kickoff Meeting, Northeastern University, Boston, MA, Nov. 29-30, 2008.
70. M.L. Ramirez, L.C. Pacheco-Londoño, O.M. Primera-Pedrozo, W. Ortiz, M. Barreto-Caban, P. Fierro and S.P. Hernández-Rivera, “Explosives Contamination Simulation by Nanoparticles Sprayers: Preparing Explosive Contamination Standards”, ALERT-DHS-COE Kickoff Meeting, Northeastern University, Boston, MA, Nov. 29-30, 2008.
71. O. M. Primera-Pedrozo, O.E. Rivera-Betancourt, W. Ortiz, A.M. Chamoun-Emanuelli, W. Medina-Ramos, A. Rivera, L.C. Pacheco-Londoño, P. Fierro-Mercado and S.P. Hernández-Rivera, “Silver, Gold, and Copper Nanoparticles for Homeland Security Applications: Surface Enhanced Raman Spectroscopy Detection of Explosives and other Threat Chemicals”, ALERT-DHS-COE Kickoff Meeting, Northeastern University, Boston, MA, Nov. 29-30, 2008.
72. Samuel P. Hernández-Rivera, Standoff Detection of Explosives Using a Raman Telescope, 11th Annual Landmine Detection Research Review Meeting, Springfield, VA, 29-30 January, 2008
73. M.L. Ramírez, W. Ortiz, O. Ruiz, L.C. Pacheco-Londoño and S.P. Hernández-Rivera, “Raman Based Bottle Screener for Concealed Hazardous Liquids”, ALERT-DHS-COE Kickoff Meeting, Northeastern University, Boston, MA, Nov. 29-30, 2008.
74. Nelson Granda-Paz, Samuel P. Hernández-Rivera, L. Granda-Marulanda, A. Torres and I. Otero, Adsorption of 2,4,6-trinitrotoluene from aqueous solutions using untreated and pyrolyzed tire rubber, 235th American Chemical Society Meeting, New Orleans, LA, April, 2008.
75. Alvaro J. Peña-Quevedo, Robert B. Cody, James Laramée, Michael Niles, Dupont Durst, Samuel P. Hernández-Rivera, Novel methodology for energetic organic peroxides analysis: Direct analysis in real time-TOF- MS, ISSSR 2008, Hoboken, NJ, June 2008.
76. Omar E. Rivera-Betancourt, E. Espinosa and S.P. Hernández-Rivera, Raman scattering study of o-and p-dinitrobenzenes on the surface of Cu nanoparticles with visible excitation and Density Functional Theory, ISSSR 2008, Hoboken, NJ, June 2008.
77. Leonardo C. Pacheco-Londoño, W. Ortiz, O.M. Primera-Pedrozo and S.P. Hernández-Rivera, Standoff Raman Detection of Explosives, ISSSR 2008, Hoboken, NJ, June, 2008.
78. M.L. Ramirez, W. Ortiz, L.C. Pacheco-Londoño and S.P. Hernández-Rivera, Remote Detection of Hazardous Liquids Concealed in Glass and Plastic Containers, ISSSR 2008, Hoboken, NJ, June, 2008.
79. William Ortiz-Rivera, L.C. Pacheco-Londoño and S.P. Hernández-Rivera, Standoff Raman Spectroscopy System for Detection of Explosives, Chemical Warfare Agents Simulants and Toxic Industrial Compounds, ISSSR 2008, Hoboken, NJ, June, 2008.
80. Samuel P. Hernández-Rivera, Leonardo Pacheco-Londoño, Oliva M. Primera-Pedrozo, William Ortiz and Miguel E. Castro, Modeling of Nitro Group in Explosives: Spectroscopic Measurements and Theoretical Calculations, 2007 IEEE Antennas and Propagation International Symposium, Honolulu, HI, June 10-14, 2007.
81. Samuel P. Hernandez-Rivera, Jackeline I. Jeréz-Rozo, Oliva M. Primera-Pedrozo, Edwin De La Cruz-Montoya, Leonardo C. Pacheco-Londoño, Nanotechnology Based Detection of Explosives, Chemical, Biological and other Threat Agents, 2007 Nanoelectronic Devices for Defense & Security (NANO-DDS) Conference, Crystal City, VA, June 18-21, 2007.
82. Samuel P. Hernández-Rivera, Edwin de la Cruz-Montoya, Gabriel A. Pérez-Acosta and Jackeline I. Jerez-Rozo, Enhanced Raman Scattering of Nitroexplosives on Colloidal Nanoparticles of Ag/TiO₂, Nanoscience and Nanotechnology for Chemical and Biological Defense Symposium, 236th American Chemical Society National Meeting, Boston, MA, August, 2007.
83. Samuel P. Hernandez-Rivera, Leonardo C. Pacheco-Londoño, William Ortiz, and Omar Rivera-Betancourt, Enhanced Raman Detection using Spray-On Nanoparticles/Remote Sensed Raman Spectroscopy, Nanoscience and Nanotechnology for Chemical and Biological Defense Symposium, 236th American Chemical Society National Meeting, Boston, MA, August, 2007.
84. Oliva M Primera-Pedrozo, Yadira M Soto-Feliciano, Jacqueline I Jerez-Rozo, Miguel E Castro and Samuel P Hernandez-Rivera, Gold Nanorods Substrates at Different Aspect Ratios for Sensing Applications, Nanoscience and Nanotechnology for Chemical and Biological Defense Symposium, 236th American Chemical Society National Meeting, Boston, MA, August 2007.
85. Samuel P. Hernandez-Rivera, Leonardo C. Pacheco-Londoño, William Ortiz, and Omar Rivera-Betancourt, Enhanced Raman Detection using Spray-On Nanoparticles/Remote Sensed Raman Spectroscopy, Nanoscience and Nanotechnology for Chemical and Biological

Defense Symposium, 236th American Chemical Society National Meeting, Boston, MA, August, 2007.

86. Oliva M Primera-Pedrozo, Yadira M Soto-Feliciano, Jacqueline I Jerez-Rozo, Miguel E Castro and Samuel P Hernandez-Rivera, Gold Nanorods Substrates at Different Aspect Ratios for Sensing Applications, Nanoscience and Nanotechnology for Chemical and Biological Defense Symposium, 236th American Chemical Society National Meeting, Boston, MA, August, 2007.

87. Jackeline I. Jeréz-Rozo, Oliva M. Primera-Pedrozo, Leonardo C Pacheco-Londoño, Ana Maria Chamoun, Marcia R Balaguera-Gelves, Samuel P. Hernandez-Rivera, Enhanced Raman Scattering of TNT based on metal colloids on layers: Preparation, Characterization and Applications, Platform Presentation, 2007 Nanoelectronic Devices for Defense & Security (NANO-DDS) Conference, Crystal City, VA, June 18-21, 2007.

88. Alvaro J. Peña-Quevedo, Robert B. Cody, Nairmen Mina-Calmide and Samuel P. Hernández-Rivera, "Preparation, Characterization and identification of Tetramethylene Diperoxide Dicarbamide by Mass Spectrometry and Vibrational Microscopy", 31st PR-ACS Senior Technical Meeting, Mayaguez PR, November, 2007.

89. Yadira M. Soto-Feliciano, Oliva M. Primera-Pedrozo, Ana Maria Chamoun, Markelle Gibbs and Samuel P. Hernandez-Rivera, Synthesis of Silver Colloids Using Sodium Citrate for Defense Surface Enhanced Raman Applications: Varying Citrate - Salt - Colloid Concentrations and Excitation Wavelength, 31st PR-ACS Senior Technical Meeting, Mayaguez PR, November, 2007.

90. Alvaro J. Peña-Quevedo, Robert B. Cody, and Samuel P. Hernández-Rivera, Novel Method Development for Analysis of High Energy Peroxides by Direct Analysis in Real Time Mass Spectrometry, 31st PR-ACS Senior Technical Meeting, Mayaguez PR, November, 2007.

91. Sandra L. Peña Luengas, Jackeline I. Jeréz, Mady M. Vega Ayala, Victor de la Cruz and Samuel P. Hernández-Rivera, SPME-HPLC Methodology for Detection of Nitroexplosives, 31st PR-ACS Senior Technical Meeting, Mayaguez PR, November, 2007.

92. Deborah E. Nieves Mercado, William Ortiz-Rivera, Leonardo C. Pacheco Londoño, Michael Ramirez, Orlando Ruiz and Samuel P. Hernandez-Rivera, Detection of Toxic industrial compounds and Chemical Warfare agent simulant in water contained in commercial bottles, 31st PR-ACS Senior Technical Meeting, Mayaguez PR, November, 2007.

93. Padilla, I.Y., Rate Limiting Fate and Transport of Explosive Chemical from Point Buried Sources, Oral Presentation in 10th Annual Army Landmine Basic Research Technical Review Meeting, January 31-February 1, 2007 in Springfield, Va.

94. Padilla, I. Y., J. P. Gutiérrez, M. d. L. Irizarry, Marín, and S. Hwang, Transport of Explosive Related Chemicals from Point Sources, Poster Presentation in Detection and Remediation Technologies for Mines and Minelike Targets XII, SPIE Defense and Security Symposium, April 9-12, 2007 in Orlando, FL.

95. Molina, G.M., I.Y. Padilla, and M. Pando, Infiltration Experiments Through Unsaturated Sand Using a Field Lysimeter, Poster Presentation in UPRM Sigma Xi VIII Symposium, April 27, 2007.

96. Padilla, I. Y. and J.P. Gutiérrez, Transport of TNT and DNT in Soil Under Infiltration and Evaporation Events, Poster Presentation in American Geophysical Union 2007 Joint Assembly, Acapulco, Mexico, May, 22-25, 2007.

97. Padilla, I. Y. and S. Hwang, Development of Physical Models for Fate and Transport Measurements of TNT and DNT Under Variable Environmental Conditions, Oral Presentation in American Geophysical Union 2007 Joint Assembly, Acapulco, Mexico, May 22-25, 2007.

98. Rosangela Rivera and Nairmen Mina Adsorption of Landmine Chemical Explosives on Soil clay Mineral Surfaces, , Real-Time Explosive Specific Chemical Sensors MURI Review, Mayagüez, PR, March 2007.

99. Nairmen Mina, Vibrational Spectroscopy and theoretical Modeling of Landmine Chemical Explosives in Soil Environments. Real-Time Explosive Specific Chemical Sensors MURI Review, Mayagüez, PR, March 2007.

100. Rosangela Rivera and Nairmen Mina, Adsorption Coefficients for TNT-Soil and TNT-Clay Interactions, EXPOCHEM 2006, Rafael A. Mangual Coliseum, University of Puerto, November 9-11, 2006.

101. Samuel P. Hernández-Rivera Miguel E Castro, Jacqueline I. Jeréz-Rozo, Edwin De La Cruz, Leonardo C. Pacheco-Londoño and Oliva M. Primera-Pedrozo, Surface Enhanced Raman Scattering Detection of Threat Chemicals, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, 2006.

102. Samuel P. Hernández-Rivera, Raman and FTIR of Threat Chemicals: Applications in Defense and Security, EXPOCHEM 2006, University of Puerto Rico, Mayagüez, PR, November 9-11, 2006.

103. Vazquez M., Padilla I., Hwang S. "Effect of Surface Vegetation on the Fate, Transport and Detection of Explosives-Related Compounds" XVII Undergraduate Research Symposium 2006, Universidad Metropolitana (UMET), Model Institutions for Excellence (MIE), San Juan, PR. Sep. 15-16, 2006.

104. Samuel P. Hernández-Rivera, Nairmen Mina and Miguel E. Castro, Recent Developments in Vibrational Standoff Detection of Explosives, 10th Annual Landmine Detection Research Review Meeting, Springfield, VA, 31 January- 1 February, 2007.

105. Samuel P. Hernandez-Rivera, Recent Developments in Chemical Point/Standoff Detection of Explosives Using Vibrational Spectroscopy, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.

106. Leonardo Pacheco-Londoño, Oliva M Primera-Pedrozo, William Ortiz Miguel E. Castro and Samuel P. Hernández-Rivera, Modeling of Nitro Group in Explosives: Spectroscopic Measurements and Theoretical Calculations, 2007 IEEE Antennas and Propagation International Symposium, Honolulu, HI, June 10-14, 2007.

107. Samuel P. Hernandez-Rivera, Jackeline I. Jeréz-Rozo, Oliva M. Primera-Pedrozo, Edwin De La Cruz-Montoya, Leonardo C. Pacheco-Londoño, Nanotechnology Based Detection of Explosives, Chemical, Biological and other Threat Agents, 2007 Nanoelectronic Devices for Defense & Security (NANO-DDS) Conference, Crystal City, VA, June 18-21, 2007.

108. Yadira Soto–Feliciano, Oliva M. Primera-Pedrozo and Samuel P. Hernández-Rivera, Synthesis of Silver Nanorods at Different Aspect Ratio for Surface-Enhanced Raman Scattering (SERS) Applications, National Conference on Undergraduate Research 2007 (NCUR) at Dominican University, San Rafael, CA , April 11-15, 2007.
109. Jackeline I. Jeréz-Rozo, Oliva M. Primera-Pedrozo, Leonardo C Pacheco-Londoño, Ana Maria Chamoun, Marcia R Balaguera-Gelves, Samuel P. Hernandez-Rivera, Enhanced Raman Scattering of TNT based on metal colloids on layers: Preparation, Characterization and Applications, Platform Presentation, 2007 Nanoelectronic Devices for Defense & Security (NANO-DDS) Conference, Crystal City, VA, June 18-21, 2007.
110. Yadira Soto–Feliciano, Oliva M. Primera-Pedrozo, Leonardo C. Pacheco-Londoño and Samuel P. Hernández-Rivera, Synthesis of Gold Nanorods at Different Aspect Ratio for Surface-Enhanced Raman Spectroscopy (SERS) Applications, More Graduate Education at Mountain State Alliance 2007 (MGE@MSA) at Arizona State University, April 21-24, 2007.
111. Kristina Soto, Tatiana Luna and Samuel P. Hernandez-Rivera, Spectroscopic Characterization of Biological Agents Using Normal Raman and Surface Enhanced Raman Scattering. More Graduate Education at Mountain State Alliance 2007 (MGE@MSA) at Arizona State University, April 21-24, 2007.
112. Deborah Nieves, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera. Chemical Warfare Agents Stimulants (CWAS) Detection on different surfaces using Fiber Optic Coupled Grazing Angle Probe-FTIR, Puerto Rico Interdisciplinary Scientific Meeting (PRISM 2007) and Junior Technical Meeting 2007, Interamerican University of Puerto Rico, Bayamón Campus, PR, March 10, 2007.
113. Nelmarie Rodriuez, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera 2, 4, 6-trinitrotoluene on Non Traditional Surfaces: Fiber Optic Coupled Grazing Angle Probe- FTIR Detection, Puerto Rico Interdisciplinary Scientific Meeting (PRISM 2007) and Junior Technical Meeting 2007, Interamerican University of Puerto Rico, Bayamón Campus, PR, March 10, 2007.
114. Oliva M. Primera-Pedrozo, Yadira M. Soto-Feliciano, Evamarie Figueroa-Mass, and Leonardo C. Pacheco-Londoño and Samuel P. Hernández-Rivera. Gold Nanorods at Different Aspect Ratios for Surface-Enhanced Raman Scattering (SERS) Applications. Puerto Rico Interdisciplinary Scientific Meeting (PRISM 2007) and Junior Technical Meeting 2007, Interamerican University of Puerto Rico, Bayamón Campus, PR, March 10, 2007.
115. Kristina Soto, Tatiana Luna and Samuel P. Hernandez-Rivera, Spectroscopic Characterization of Biological Agents Using Normal Raman and Surface Enhanced Raman Scattering. Puerto Rico Interdisciplinary Scientific Meeting (PRISM 2007) and Junior Technical Meeting 2007, Interamerican University of Puerto Rico, Bayamón Campus, PR, March 10, 2007.
116. Alvaro J. Peña-Quevedo, Mildred M. Ramos-Torrés, José R. González, Luis A. Rivera-Montalvo, Nairmen Mina-Calmide, and Samuel P. Hernández-Rivera, Vibrational Characterization, Identification and Detection of High Energy Organic Peroxides: TATP, DADP, HMTD and TMDD, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
117. Alvaro J. Peña-Quevedo, Robert Cody and Samuel P. Hernández-Rivera, Novel Method Development of Trace Detection High Energy Organic Peroxides by AccuTOF - Direct Analysis in Real Time (DART), SIGMA XI, XII 2007 STUDENTS POSTER DAY, April 26, 2007.
118. Jose R. Gonzalez, Mildred M. Ramos-Torres Alvaro J. Peña-Quevedo and Samuel P. Hernández-Rivera, Method Development for Trace Detection of Triacetone Triperoxide Mixed with Sucrose by Raman Spectrometry, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
119. Alvaro J. Peña-Quevedo , Robert Cody, Nairmen Mina-Camilde and Samuel P. Hernández-Rivera, Detection of High Energy Amine Peroxides by Direct Analysis in Real Time-TOF, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
120. Bibiana Báez, Vivian Florian, Andrea Cabanzo, Julio Briano, Miguel Castro and Samuel P. Hernández-Rivera, Detection of Chemical Signatures from TNT Buried in Sand at Various Ambient Conditions: Phase II, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
121. Deborah Nieves, Oliva M. Primera-Pedrozo, Orlando Ruiz, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, Detection of Chemical Warfare Agents Simulants (CWAS) using Fiber Optic Coupled Grazing Angle Probe-FTIR, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
122. Edwin De La Cruz- Montoya, Tatiana Luna-Pineda, Gabriel Pérez-Acosta and Samuel P. Hernández-Rivera, Nanoparticles of Ag/TiO₂ as Raman Scattering Surfaces for Enhanced Detection of Explosives, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
123. Evamarie Figueroa-Mas , Yadira Soto –Feliciano, Oliva M. Primera-Pedrozo, , and Samuel P. Hernandez-Rivera, Gold Nanorods at Different Aspect Ratio for Surface-Enhanced Raman Scattering (SERS) Applications, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
124. Yadira Soto-Feliciano, Evamarie Figueroa-Mas, Oliva M. Primera-Pedrozo and Samuel P. Hernandez-Rivera, Silver Nanorods at Different Aspect Ratios for Surface-Enhanced Raman Scattering (SERS) Applications, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
125. Gabriel Perez, Edwin De La Cruz, Víctor De La Cruz, Leonardo C. Pacheco and Samuel P. Hernandez-Rivera Photodegradation Kinetics of Explosives Catalyzed by TiO₂ Nanoparticles, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico –

Mayagüez, Mayagüez, PR, April 26, 2007.

126. Gloria Marcela Herrera-Sandoval Luz Marina Ballesteros, Nairmen Mina, Julio Briano and Samuel P. Hernández-Rivera, TNT –Montmorillonite Clay Particles Vibrational Signatures, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
127. Jackeline I. Jerez-Rozo, Ana Maria Chamoun and Samuel P. Hernández-Rivera, SERS Detection of Nitroexplosives on Nanoparticles Substrates: Ag and Au Colloids and Au-Ag Alloys, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
128. Leonardo Pacheco-Londoño, Oliva M. Primera-Pedrozo, William Ortiz, Pedro M. Fierro, and Samuel P. Hernández-Rivera, Standoff Detection of Explosives Using a Raman Telescope, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
129. Marcos A. Barreto-Cabán and Samuel P. Hernández-Rivera, Novel Method for the Preparation of Explosives Nanoparticles, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
130. Michael L. Ramirez, Leonardo Pacheco-Londoño and Samuel P. Hernández-Rivera, Characterization of Peroxide-based Explosives by Thermal Analysis, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
131. Mildred Ramos, Alvaro J. Peña-Quevedo and Samuel P. Hernández-Rivera, Method Development for Identification and Trace Detection of High Energy Amine Peroxides by GC-MS, FT-NMR and Vibrational Microscopy, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
132. Nelmarie Rodríguez –Cardona, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, Detection of TNT on Non Traditional Surfaces by Fiber Optic Coupled Grazing Angle Probe – FTIR, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
133. Orlando Ruiz, Oliva M. Primera-Pedrozo, Leonardo C. Pacheco-Londoño, Michael Ramirez and Samuel P. Hernández-Rivera, Comparison of Transfer Techniques for Explosives Detection, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
134. Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño, Yadira Soto -Feliciano and Samuel P. Hernandez-Rivera, Detection of Explosive Mixtures on Surfaces using Grazing Angle Probe – FTIR, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
135. Pedro Fierro, Omar Rivera-Betancourt, Nairmen Mina, Miguel E. Castro and Samuel P. Hernández-Rivera, UV Raman Detection of 2,4 -DNT in contact with Sand Particles, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
136. Ricardo Infante-Castillo, and Samuel P. Hernández-Rivera, Experimental and theoretical and vibrational and NMR studies of RDX, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
137. Sandra L. Peña, Edwin de la Cruz, Samuel P. Hernández-Rivera, HPLC – SPME Methodology for Detection of Nitroexplosives, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
138. Sandra N. Correa, Bibiana Baez and Samuel P. Hernández-Rivera, Detection of explosives by SPME/GC in buried TNT soils, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
139. Tatiana Luna-Pineda, Kristina Soto-Feliciano, Edwin De La Cruz-Montoya, Carlos Rios-Velázquez and Samuel P. Hernández-Rivera, Spectroscopic Characterization of Biological Agents Using Normal Raman and Surface Enhanced Raman Spectroscopy, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
140. William Ortiz, Doris Nunez-Quintero, Leonardo C. Pacheco-Londoño and Samuel Hernández-Rivera, Spectroscopic Modeling of Nitro Group in Explosives, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
141. Yadira Soto–Feliciano, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, Temperature Dependence of Detection Limits of TNT on Metallic Surfaces using Fiber Optic Coupled FTIR, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
142. Alvaro J. Peña-Quevedo, Robert Cody, Nairmen Mina-Camilde and Samuel P. Hernández-Rivera, Detection of High Energy Amine Peroxides by Direct Analysis in Real Time-TOF, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
143. Bibiana Báez, Vivian Florian, Andrea Cabanzo, Julio Briano, Miguel Castro and Samuel P. Hernández-Rivera, Detection of Chemical Signatures from TNT Buried in Sand at Various Ambient Conditions: Phase II, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
144. Edwin De La Cruz- Montoya Tatiana Luna-Pineda, Gabriel Pérez-Acosta and Samuel P. Hernández-Rivera, Nanoparticles of Ag/TiO₂ as Raman Scattering Surfaces for Enhanced Detection of Explosives, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
145. Gabriel Perez, Edwin De La Cruz, Víctor De La Cruz, Leonardo C. Pacheco and Samuel P. Hernandez-Rivera, Photodegradation Kinetics of Explosives Catalyzed by TiO₂ Nanoparticles, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino,

Mayagüez, PR, March 6-7, 2007.

146. Edwin De La Cruz Montoya, Miguel E. Castro and Samuel Hernández Rivera, Enhanced Raman Spectroscopy of 2,4,6-Trinitrotoluene and 2,4-Dinitrotoluene in Anatase and Rutile Titania Nanocrystals, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
147. Gloria Marcela Herrera-Sandoval, Luz Marina Ballesteros, Nairmen Mina, Julio Briano and Samuel P. Hernández-Rivera, TNT –Montmorillonite Clay Particles Vibrational Signatures, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
148. Jackeline I. Jerez-Rozo, Ana Maria Chamoun and Samuel P. Hernández-Rivera, SERS Detection of Nitroexplosives on Nanoparticles Substrates: Ag and Au Colloids and Au-Ag Alloys, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
149. Leonardo Pacheco-Londoño, Oliva M. Primera-Pedrozo, William Ortiz, Pedro M. Fierro, and Samuel P. Hernández-Rivera, Standoff Detection of Explosives Using a Raman Telescope, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
150. Marcos A. Barreto-Cabán and Samuel P. Hernández-Rivera, Novel Method for the Preparation of Explosives Nanoparticles, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
151. Michael L. Ramirez, Leonardo Pacheco-Londoño and Samuel P. Hernández-Rivera, Characterization of Peroxide-based Explosives by Thermal Analysis, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
152. Mildred Ramos, Alvaro J. Peña-Quevedo and Samuel P. Hernández-Rivera, Method Development for Identification and Trace Detection of High Energy Amine Peroxides by GC-MS, FT-NMR and Vibrational Microscopy, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
153. Nelmarie Rodríguez-Cardona, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, Detection of 2, 4, 6-Trinitrotoluene on Non Traditional Surfaces by Fiber Optic Coupled Grazing Angle Probe-FTIR, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
154. Orlando Ruiz Oliva M. Primera-Pedrozo, Leonardo C. Pacheco-Londoño, Michael Ramirez and Samuel P. Hernández-Rivera, Comparison of Transfer Techniques for Explosives Detection, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
155. Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño, Yadira Soto -Feliciano and Samuel P. Hernandez-Rivera, Detection of Explosive Mixtures on Surfaces using Grazing Angle Probe-FTIR, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
156. Pedro Fierro, Omar Rivera-Betancourt, Nairmen Mina, Miguel E. Castro and Samuel P. Hernández-Rivera, UV Raman Detection of 2,4 -DNT in contact with Sand Particles, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
157. Ricardo Infante-Castillo, and Samuel P. Hernández-Rivera, Experimental and theoretical and vibrational and NMR studies of RDX, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
158. Sandra L. Peña, Edwin de la Cruz, Samuel P. Hernández-Rivera, HPLC – SPME Methodology for Detection of Nitroexplosives, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
159. Sandra N. Correa, Bibiana Baez and Samuel P. Hernández-Rivera, Detection of explosives by SPME/GC in buried TNT soils, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
160. Tatiana Luna-Pineda, Kristina Soto-Feliciano, Edwin De La Cruz-Montoya, Carlos Ríos-Velázquez and Samuel P. Hernández-Rivera, Spectroscopic Characterization of Biological Agents Using Normal Raman and Surface Enhanced Raman Spectroscopy, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
161. William Ortiz, Doris Nunez-Quintero, Leonardo C. Pacheco-Londoño and Samuel Hernández-Rivera, Spectroscopic Modeling of Nitro Group in Explosives, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
162. Yadira Soto-Feliciano, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, Temperature Dependence of Detection Limits of TNT on Metallic Surfaces using Fiber Optic Coupled FTIR, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, 2007.
163. Deborah Nieves, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera. Chemical Warfare Agents Stimulants (CWAS) Detection on different surfaces using Fiber Optic Coupled Grazing Angle Probe-FTIR, Puerto Rico Interdisciplinary Scientific Meeting (PRISM 2007) and Junior Technical Meeting 2007, Interamerican University of Puerto Rico, Bayamón Campus, PR, March 10, 2007.
164. Nelmarie Rodriuez, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera 2, 4, 6-trinitrotoluene on Non Traditional Surfaces: Fiber Optic Coupled Grazing Angle Probe- FTIR Detection, Puerto Rico Interdisciplinary Scientific Meeting (PRISM 2007) and Junior Technical Meeting 2007, Interamerican University of Puerto Rico, Bayamón Campus, PR, March 10, 2007.
165. Oliva M. Primera-Pedrozo, Yadira M. Soto-Feliciano, Evamari Figueroa-Mass, and Leonardo C. Pacheco-Londoño and Samuel P. Hernández-Rivera. Gold Nanorods at Different Aspect Ratios for Surface-Enhanced Raman Scattering (SERS) Applications. Puerto Rico Interdisciplinary Scientific Meeting (PRISM 2007) and Junior Technical Meeting 2007, Interamerican University of Puerto Rico, Bayamón

Campus, PR, March 10, 2007.

166. Kristina Soto, Tatiana Luna and Samuel P. Hernandez-Rivera, Spectroscopic Characterization of Biological Agents Using Normal Raman and Surface Enhanced Raman Scattering. Puerto Rico Interdisciplinary Scientific Meeting (PRISM 2007) and Junior Technical Meeting 2007, Interamerican University of Puerto Rico, Bayamón Campus, PR, March 10, 2007.
167. Alvaro J. Peña-Quevedo, Robert B. Cody, Nairmen Mina-Calmide, and Samuel P. Hernández-Rivera, Synthesis, Characterization and Identification of Tetramethylene Diperoxide Dicarbamide by Direct Analysis Real Time –Mass Spectrometry and Vibrational Microscopy, 233rd American Chemical Society Meeting, Chicago, IL, March 25-29, 2007.
168. Kristina Soto-Feliciano, Tatiana Luna-Pineda, Edwin De La Cruz-Montoya, Carlos Ríos-Velázquez and Samuel P. Hernández-Rivera, “Spectroscopic Characterization of Biological Agents Using Normal Raman and Surface Enhanced Raman Spectroscopies”, 3rd Latin American and Caribbean Biotechnology Congress, Mayagüez, PR, September 22, 2006.
169. Bibiana Báez, Vivian Florián, Samuel P. Hernández-Rivera*, Andrea Cabanzo, Sandra Correa, Maik Irrazábal, Julio G. Briano, Miguel E. Castro, “Detection of chemical signatures from TNT buried in sand at various ambient conditions” American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, 2006.
170. Deborah Nieves, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, “Detection of Chemical Warfare Agents Simulants (CWAS) using Fiber Optic Coupled Grazing Angle Probe-FTIR”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, 2006.
171. Alvaro J. Peña-Quevedo, Robert B. Cody, Nelmarie Rodríguez, Deborah Nieves, Miguel Castro-Rosario, Nairmen Mina-Camide, and Samuel P. Hernández-Rivera, “Synthesis, Characterization and Differentiation of High Energy Amine Peroxides by DART-TOF-MS and Vibrational Microscopy”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, 2006.
172. Gabriel Perez, Edwin De La Cruz, Victor De La Cruz, Leonardo C. Pacheco and Samuel P. Hernández-Rivera, “Structural properties and Photodegradation Kinetic relationships of explosives with TiO₂ nanoparticles”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, 2006.
173. Gloria Marcela Herrera-Sandoval, Luz Marina Ballesteros, Nairmen Mina, Julio Briano, and Samuel P. Hernández-Rivera, “Vibrational Signatures of TNT-Montmorillonite Clay Particles”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, 2006.
174. Maik Irrazábal, Vivian Florián, Samuel P. Hernández-Rivera, and Julio G. Briano, “Fate and Transport of ERCs in Soil from Landmine Emissions, Numerical Simulations”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, 2006.
175. Jackeline I. Jeréz-Rozo, Ana Maria Chamoun, Joany Hernández and Samuel P. Hernández-Rivera, “Enhanced Raman scattering of nitro-explosives on nanoparticle substrates: Ag and Au colloids and Au-Ag alloy”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, 2006.
176. Leonardo Pacheco-Londoño, Oliva M. Primera-Pedrozo and Samuel P. Hernández-Rivera, “Standoff Infrared Detection of Explosives at Laboratory Scale”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, 2006.
177. Nelmarie Rodríguez –Cardona, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, “Detection of 2, 4, 6-Trinitrotoluene on Surfaces using Fiber Optic Coupled Grazing Angle Probe- FTIR, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, 2006.
178. Ricardo Infante-Castillo and Samuel P. Hernández-Rivera, “Theoretical and experimental vibrational and NMR studies of RDX”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, 2006.
179. Sandra Peña Edwin de la Cruz, Samuel P. Hernández-Rivera, “Development of SPME – HPLC Methodology for Detection of Nitroexplosives”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, 2006.
180. Tatiana Luna-Pineda, Kristina Soto-Feliciano, Edwin De La Cruz-Montoya, Carlos Ríos-Velázquez and Samuel P. Hernández-Rivera, “Spectroscopic Characterization of Biological Agents Using Normal Raman and Surface Enhanced Raman Spectroscopy”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, 2006.
181. Yadira Soto-Feliciano, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, “Temperature Dependence of the Limits of Detection of TNT on Metallic Surfaces using Fiber Optic Coupled-FTIR”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, 2006.
182. Alvaro J. Peña-Quevedo, Robert B. Cody, Nelmarie Rodríguez, Deborah Nieves, Miguel Castro-Rosario, Nairmen Mina-Camide and Samuel P. Hernández-Rivera, “Characterization and Differentiation of High Energy Amine Peroxides by DART-TOF-MS and Vibrational Microscopy”, EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, 2006.
183. Bibiana Báez, Vivian Florián, Samuel P. Hernández-Rivera, Andrea Cabanzo, Sandra Correa, Maik Irrazabal, Julio G. Briano, Miguel E. Castro, Detection of chemical signatures from TNT buried in sand at various ambient conditions”, EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, 2006.
184. Deborah Nieves, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, “Detection of Chemical Warfare Agents Simulants (CWAS) using Fiber Optic Coupled Grazing Angle Probe-FTIR”, EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, 2006.
185. Gabriel Perez, Edwin De La Cruz, Victor De La Cruz, Leonardo C. Pacheco and Samuel P. Hernández-Rivera, “Photodegradation

- Kinetics of explosives with TiO₂ nanoparticles”, EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, 2006.
186. Gloria Marcela Herrera-Sandoval, Luz Marina Ballesteros, Nairmen Mina, Julio Briano and Samuel P. Hernández-Rivera, “FTIR and Raman Signatures of TNT –Montmorillonite Clay Particles”, EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, 2006.
187. Jackeline I. Jeréz-Rozo, Ana Maria Chamoun, Joany Hernández and Samuel P. Hernández-Rivera, “Detection of nitro-explosives by Enhanced Raman scattering on nanoparticle substrates: Ag and Au colloids and Au-Ag alloy”, EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, 2006.
188. Leonardo Pacheco-Londoño, Oliva M. Primera-Pedrozo and Samuel P. Hernández-Rivera, “Detection of Explosives by Standoff Infrared at Laboratory Scale”, EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, 2006.
189. Nelmarie Rodríguez –Cardona, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, “Fiber Optic Coupled Grazing Angle Probe- FTIR Detection of 2, 4, 6-Trinitrotoluene on Surfaces”, EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, 2006.
190. Ricardo Infante-Castillo and Samuel P. Hernández-Rivera, Theoretical and experimental vibrational and NMR studies of RDX, EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, 2006.
191. Sandra Peña, Edwin de la Cruz, Samuel P. Hernández-Rivera, “Development of SPME – HPLC Methodology for Detection of Nitroexplosives”, EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, 2006.
192. Tatiana Luna-Pineda, Kristina Soto-Feliciano, Edwin De La Cruz-Montoya, Carlos Ríos-Velázquez and Samuel P. Hernández-Rivera, “Normal Raman and Surface Enhanced Raman Spectroscopy Detection of Biological Agents”, EXPOCHEM 2006, University of Puerto Rico, Mayagüez, PR, November 9-11, 2006.
193. Vibrational Spectroscopy of Explosives: From the Research Lab to Field Experiments, Samuel P. Hernández-Rivera, 9th Annual Army Landmine Basic Research Technical Review Meeting, Sponsored by the Army Research Office and the Joint Unexploded Ordnance Coordination Office, Springfield, Virginia, February 2006.
194. Samuel P. Hernández-Rivera, MURI Center For Chemical Sensors Development: Program Overview, Real-Time Explosive Specific Chemical Sensors MURI Review Big Sky, Montana, February 2006.
195. Samuel P. Hernández-Rivera, Vibrational Spectroscopy of Explosives, Real-Time Explosive Specific Chemical Sensors MURI Review Big Sky, Montana, February 2006.
196. Julio Briano, Review of Numerical Simulation of Fate and Transport of ERCs in Soil from Landmine Emissions, Real-Time Explosive Specific Chemical Sensors MURI Review Big Sky, Montana, February 2006.
197. Julio Briano, Finite Volume Elements Calculation of Transport of Explosives in Soils, Real-Time Explosive Specific Chemical Sensors MURI Review Big Sky, Montana, February 2006.
198. Julio Briano, Fate and Transport of TNT from Landmines, a Numerical Approach, 9th Annual Army Landmine Basic Research Technical Review Meeting, Sponsored by the Army Research Office and the Joint Unexploded Ordnance Coordination Office, Springfield, Virginia, February 2006.
199. Yadira Soto-Feliciano, Fiber Optic Coupled – Reflection Absorption Infrared Spectroscopy: Development of Sensitive and Robust Quantitative Analysis Methodology of Traces of Organic Residues on Surfaces, Proceedings of The National Conference on Undergraduate Research (NCUR) 2006, The University of North Carolina at Asheville, Asheville, North Carolina, April 6 – 8, 2006.
200. Alia El Burai-Félix, SER(R)S of Gold and Silver Metal Colloidal Film Deposited on a Flexible Polymer Substrate, 26th Puerto Rico Interdisciplinary Scientific Meeting, 41st Junior Technical Meeting, Cayey, PR, March, 2006.
201. Yadira Soto-Feliciano, TNT and PETN on surfaces: Grazing Angle – FTIR, 26th Puerto Rico Interdisciplinary Scientific Meeting, 41st Junior Technical Meeting, Cayey, PR, March, 2006.
202. Samuel P. Hernández-Rivera, Vibrational Spectroscopy of Chemical Agents and Toxic Vapors: From the Research Lab to Field Experiments, 2006 International Symposium on Spectral Science Research, Bar Harbor ME, June, 2006.
203. Samuel P. Hernández-Rivera, Center For Chemical Sensors Development, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.
204. Samuel P. Hernández-Rivera, Vibrational Spectroscopy Applied to IED Defeat: From The Research Lab to Field Experiments, UXO/Countermine/Range, Forum 2006, Las Vegas, Nevada, July, 2006.
205. Rosángela Rivera, Liliana Alzate, Neisa M. Hernandez, Samuel P. Hernandez, and Nairmen Mina, Adsorption of TNT on clay minerals, 231st ACS National Meeting & Exposition, Atlanta GA, March 26-30, 2006.
206. Neisa M. Hernandez, Rosángela Rivera, Liliana Alzate, Yleana Colon, Samuel P. Hernandez, and Nairmen Mina Molecular orbital calculations of the RDX-siloxane surface complex, 231st ACS National Meeting & Exposition, Atlanta GA, March 26-30, 2006.
207. Leonardo C. Pacheco, Vibrational spectroscopy study of triacetone triperoxide: Experimental and DFT Theoretical Studies, XXXI Congreso de Químicos Teóricos de Expresión Latina (“Congress of Theoretical Chemist of Latin Expression”), QUITEL2005, Margarita Island, Venezuela, October 2-6, 2005.
208. Oliva M Primera, Stability and Verification of TATP Fragment Cations in Gas Phase: Mass Spectrometry and DFT Theoretical Studies, XXXI Congreso de Químicos Teóricos de Expresión Latina (“Congress of Theoretical Chemist of Latin Expression”), QUITEL2005,

Margarita Island, Venezuela, October 2-6, 2005.

209. Yadira Soto, TNT and PETN on surfaces: Grazing Angle – FTIR, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005

210. Álvaro J. Peña, Analytical Methodology for Identification and Trace Analysis of Cyclic Acetone Peroxide Compounds by GC-MS, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.

211. Neisa M. Hernández, Liliana Alzate, Rosangela Rivera, Samuel P. Hernández and Nairmen Mina. Interactions and vibrational spectroscopic signature of TNT in soil. XXIX ACS Senior Technical Meeting, Lajas P.R., November 2005.

212. Padilla, Ingrid, Diego Perez, and Juan Pablo Gutierrez, Two-Dimensional Modeling Of The Fate And Transport Of Explosive Chemicals Near Soil-Atmospheric Interfaces Subjected to Advection Processes, Poster presentation in Geological Society of America Annual Conference, Salt Lake City, Utah, October 16-19, 2005.

213. Perez, Diego, David Hernandez, and I. Padilla, Physical Modeling of the Fate and Transport of Explosive Chemicals in 1-D Soil Columns Subjected to Advection Processes, Poster Presentation in 25th Puerto Rico Interdisciplinary Scientific Meeting and 40th ACS Junior Technical Meeting, March 12, 2005.

214. Torres, Alexander and I. Padilla, Physical Modeling of Explosive Chemicals Diffusion in Soils Under Variable Environmental Conditions, Poster Presentation in 25th Puerto Rico Interdisciplinary Scientific Meeting and 40th ACS Junior Technical Meeting, March 12, 2005.

215. Tarafa, P. A. Torres, V. Vargas, and I. Padilla, Transport of Landmine-Derived Chemicals in Different Soils Under Variable Environmental Conditions, Poster Presentation in 25th Puerto Rico Interdisciplinary Scientific Meeting and 40th ACS Junior Technical Meeting, March 12, 2005.

216. Carmen M. Ramos, Neisa M. Hernandez, Rosángela Rivera, Liliana Alzate, Yleana Colon, Samuel P. Hernandez, and Nairmen Mina Density Functional Theory Treatment of the Structures and Vibrational Frequencies of 2,4- and 2,6-dinitrotoluenes. XXXI Congreso de Químicos Teóricos de Expresión Latina (QUITEL2005) Venezuela, Octubre 2-6, 2005.

217. Michael L. Ramírez, Characterization of Energetic Compounds Using Differential Scanning Calorimetry, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.

218. Oliva M. Primera, TNT and PETN on surfaces: Grazing Angle – FTIR, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.

219. Álvaro J. Peña, Method Development for Trace Detection and Differentiation of High Energy Cyclic Peroxide by Vibrational Microscopy, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.

220. Bibiana Báez, Detection of Explosives in Soils using SPME with Gas Chromatography and TEEM –Mass Spectrometry, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.

221. Edwin de la Cruz, Surface Enhanced Raman Spectroscopy of 2,4,6-Trinitrotoluene in Anatase Nanocrystal, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.

222. Indira Jerez-Rozo, Raman Scattering of Nitroexplosives on Nanoscaled Substrates: Tungsten Trioxide, Copper (I) Oxide, Molybdenum (VI) Oxide, Tin (IV) Oxide, Cobalt (II, III) Oxide, Cerium (IV) Oxide And Scandium Oxide, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.

223. Leonardo C. Pacheco, Nitroexplosives Classification by Molecular Descriptors, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.

224. Luz M. Ballesteros, Raman Spectroscopic Signatures of PETN in Soil, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.

225. Gloria M. Herrera, Vibrational Raman Signatures of TNT in Contact with Sand Particles, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.

226. Marcia del R. Balaguera, SERS(S) of Metal Colloidal Polymeric Film, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.

227. Michael L. Ramírez, Thermal Ink Jet Based Sample Transfer Techniques for Explosives Detection, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.

228. Hernandez-Rivera, S.P., “Spectroscopic Signature of Landmine Components in Soil and its Equilibrium Vapor: The First Step Towards Real-Time Landmine Sensing”, 7th Annual Army Landmine Basic Research Technical Review Meeting, Alexandria, VA, February 24-25, 2004.

229. Hernández-Rivera, S.P., “Detection of Explosives via Spectroscopic Signatures”, Workshop for Improvised Explosive Device (IED) Locating Through Explosives Detection, Night Vision and Electronic Sensors Directorate, Institute for Defense Analysis, Alexandria, VA, July 1, 2004.

Number of Presentations: 229.00

Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Number of Non Peer-Reviewed Conference Proceeding publications (other than abstracts):0

Peer-Reviewed Conference Proceeding publications (other than abstracts):

Number of Peer-Reviewed Conference Proceeding publications (other than abstracts):0

(d) Manuscripts

Number of Manuscripts:0.00

Patents Submitted

Patents Awarded

Awards

Graduate Students

<u>NAME</u>	<u>PERCENT SUPPORTED</u>
Leonardo C. Pacheco-Londoño	1.00
Oliva M. Primera-Pedrozo	1.00
Gloria M. Herrera-Sandoval	1.00
Bibiana Baez-Angarita	1.00
Sandra N. Correa-Torres	1.00
Luz M. Ballesteros	1.00
Alvaro Peña-Quevedo	1.00
Michael L. Ramirez-Cedeño	1.00
Ricardo Infante-Castillo	0.10
Lewis Gomez	1.00
Andrea Cabanzo	1.00
Tatiana Luna	1.00
Edwin de la Cruz	1.00
Victor de la Cruz	1.00
Marcia Balaguera	1.00
William Ortiz	1.00
Orlando Ruiz-Pesante	0.10
Marcos Barreto	0.10
Alejandro Blanco	1.00
Nelson Granda	0.20
Pedro Fierro	0.50
Yleana Colon	1.00
Indira Jerez	1.00
Maik Irrazabal	1.00
Celia Osorio	1.00
Liliana Alzate	1.00
Carmen Ramos	1.00
Neiza Hernandez	1.00
Carlos Peroza	1.00
Miguel Gonzalez	1.00
Hisamar Felix	1.00
Omar Rivera-Betancourt	1.00
José Luis Ruiz	1.00
Eduardo Espinosa	1.00
John Castro	1.00
Dustin Perez	1.00
Vivian Florian	1.00
Miguel Florian	1.00
Ernesto Borrero	
Enid Colon	1.00
Cynthia Caraballo	1.00
Jose Rivera	1.00
Rafael Rivera	1.00
Jose A. Santiago	1.00
Ivonne Feliciano	1.00
Sandra Peña	1.00
Angel Anaya	1.00
Jose Falcon	1.00
Gloria Molina	1.00
Alexander Torres	1.00
Cesar Manrique	
Rosangela Rivera	1.00
FTE Equivalent:	46.00
Total Number:	52

Names of Post Doctorates

<u>NAME</u>	<u>PERCENT SUPPORTED</u>
Alberto Santana	1.00
Jairo Castollo-Chara	1.00
FTE Equivalent:	2.00
Total Number:	2

Names of Faculty Supported

<u>NAME</u>	<u>PERCENT SUPPORTED</u>	National Academy Member
Samuel P. Hernandez-Rivera	0.35	No
Ingrid Padilla	0.25	No
Julio Briano	0.25	No
Nairmen Mina-Camilde	0.25	No
Miguel Castro-Rosario	0.25	No
Sangchul Hwang	0.25	No
FTE Equivalent:	1.60	
Total Number:	6	

Names of Under Graduate students supported

<u>NAME</u>	<u>PERCENT SUPPORTED</u>
Migdalia Hidalgo Santiago	
Sujeily Soto Medina	
Nancy Soto Acevedo	
Juan Santa Roman	
Jeylisse Castaner De Choudens	
Rosa I. Martinez Garcia	
Rhaisa Sanchez Cuprill	
Francesca Rios Miller	
Gabriela D.Rodriguez Gonzalez	
Darlyn Mercado Saldivia	
Katia Y.Lasanta Pagán	
Jean Melendez Degro	
Gabriel A.Nieves Colon	
Lorena Marrero Vilches	
Jaleidy Hernandez	
Roxannie Gonzalez	
Cristie Cordero Velazquez	
Christine Jusino Olivencia	
Marilyn M. Cancel	
Alice Arroyo Oquendo	
Cristina Alicea Matos	
FTE Equivalent:	
Total Number:	21

Student Metrics

This section only applies to graduating undergraduates supported by this agreement in this reporting period

The number of undergraduates funded by this agreement who graduated during this period:	61.00
The number of undergraduates funded by this agreement who graduated during this period with a degree in science, mathematics, engineering, or technology fields:.....	58.00
The number of undergraduates funded by your agreement who graduated during this period and will continue to pursue a graduate or Ph.D. degree in science, mathematics, engineering, or technology fields:.....	45.00
Number of graduating undergraduates who achieved a 3.5 GPA to 4.0 (4.0 max scale):	27.00
Number of graduating undergraduates funded by a DoD funded Center of Excellence grant for Education, Research and Engineering:.....	0.00
The number of undergraduates funded by your agreement who graduated during this period and intend to work for the Department of Defense	5.00
The number of undergraduates funded by your agreement who graduated during this period and will receive scholarships or fellowships for further studies in science, mathematics, engineering or technology fields:	5.00

Names of Personnel receiving masters degrees

NAME

Oliva M. Primera-Pedrozo
Leonardo Pacheco-Londoño
Alejandro Blanco
Bibiana Baez-Angarita
Sandra N. Correa-Torres
Lewis Gomez
Sandra Peña
Indira Jerez
Tatiana Luna
Luz M Ballesteros
Gloria M. Herrera
Edwin de la Cruz
Liliana Alzate
Yleana Colon
Ernesto Borrero
Jose Luis Ruiz
Eduardo Espinosa
John Castro
Marcia Balaguera
Andrea Cabanzo
Omar Rivera-Betancourt
Pedro Fierro
William Ortiz
Alexander Torres
Angel Anaya
Luis Rivera
Jose Rivera
Carmen Ramos
Rosangela Rivera
Total Number:

29

Names of personnel receiving PHDs

NAME

Maik Irrazabal

Sandra N. Correa-Torres

Ricardo Infante-Castillo

Michael L. Ramirez

Alvaro Peña-Quevedo

Oliva M. Primera-Pedrozo

Leonardo C. Pacheco-Londoño

Total Number:**7****Names of other research staff**NAMEPERCENT SUPPORTED

Denisse Negrón

1.00 No

Luis de la Torre

1.00 No

Marjorie Pratts

1.00 No

FTE Equivalent:**3.00****Total Number:****3****Sub Contractors (DD882)****Inventions (DD882)****Scientific Progress**

DoD-UPRM-MURI grant: "Establishment of a Center for Development of Chemical Sensors for Explosives at University of Puerto Rico – Mayaguez" (Proposal # 43567CHMUR; Agreement #: DAAD190210257) operated between 2002 and 2010. The project established a multidisciplinary research center for detection of landmine explosives, focusing on spectroscopic signatures of landmines explosives and transport in soil, contributing to real time chemical sensing of landmines. Goals included:

- * Measurement of spectroscopic signatures of landmine explosives in soil;
- * Measurement of effect of environmental variables on explosives;
- * Studies of soil-explosives interactions: Raman and IR spectroscopies
- * Model transport behavior of explosives in soils under different environmental conditions.

The major accomplishments during 8 years of the DoD-MURI-UPRM CCSD:

1. COMPONENT I:

TRANSPORT PHENOMENA OF EXPLOSIVE COMPONENTS IN SOIL: PHYSICAL MODELING

- ☐ Dissemination of results: results were presented at several scientific meetings. Several papers were published in peer review journals.
- ☐ Fate and transport experiments were conducted for 2-4 DNT and 2,4,6-TNT. Experimental work resulted in large amount of data used to advance scientific knowledge on the effect of environmental factors on the fate and transport of ERCs. The data also served to validate models used in the prediction of ERCs fate and transport.
- ☐ Technical accomplishments advance knowledge on fate and transport processes controlling the movement of TNT and DNT in water and vapor phases when subjected to variable environmental conditions, including: variable infiltration and evaporation events, light radiation, temperature, water flux, water content, vegetation, and boundary conditions.
- ☐ Diffusion, dissolution, sorption, and advective/dispersive properties were assessed for 2,4-DNT and 2,4,6-TNT under different environmental conditions.
- ☐ All physical models were built and instrumented. All lab-scale models and a field lysimeter are operational.
- ☐ Samplers and sampling methodology were developed for selectively sampling ERCs in the gas and liquid phase.
- ☐ Methods for analysis of large number of low-volume samples were developed.
- ☐ Fate and transport experiments were conducted for 2-4 DNT and 2,4,6-TNT.
- ☐ Two-Dimensional transport of TNT experiments were conducted under infiltration and evaporation conditions at different environmental conditions.
- ☐ TNT and DNT transport experiments were conducted in 3D laboratory-scale soil tanks under cyclic radiation and precipitation conditions.
- ☐ Effects of vegetation of fate, transport, and detection were studied.
- ☐ Diffusion, dissolution, sorption, and advective/dispersive properties were assessed for 2,4-DNT and 2,4,6-TNT under different environmental conditions.
- ☐ Field measurements and transport experiments were conducted.
- ☐ Twenty-two students from environmental, geotechnical, mechanical, chemical engineering, and soils were trained for the reported period on ERC fate and transport concepts in a multidisciplinary environment.

2. COMPONENT II:

NUMERICAL MODELING OF TRANSPORT PHENOMENA OF LANDMINE EXPLOSIVES AND DEGRADATION PRODUCTS IN SOIL

- ☐ Dissemination of results was significant, including 7 publication, 6 oral presentations, and 8 posters at scientific meetings and workshops.
- ☐ The numerical code was completely validated.
- ☐ 1d, 2d, 3d situations has been studied and published or presented in scientific meetings.
- ☐ The effect of environmental parameters on the chemical signature of TNT was approached both numerically and experimentally.
- ☐ The adsorption of TNT and degradation products on organic matter (humic and fulvic acids) was numerically approached.

3. COMPONENT III:

THEORETICAL UNDERSTANDING OF LANDMINE EXPLOSIVES: PROPERTIES AND BEHAVIOR IN SOIL

- ☐ Several papers and presentations were delivered in the SPIE Defense and Security Meetings and in peer reviewed journals.
- ☐ Computational models have been used to describe the spectroscopic signature of RDX, TNT, and 2,4-DNT.
- ☐ Adsorption properties for TNT were measured.

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- ☐ The spectroscopic signatures of TNT, DNT, and RDX on soil environments were established.
- ☐ Ten students from Chemistry, Environmental and chemical engineering and chemistry were trained on ERC fate, transport and detection concepts in a multidisciplinary environment.

4. Component IV:

SOIL-EXPLOSIVES INTERACTIONS PROPERTIES UNDER AMBIENT CONDITIONS USING FLUORESCENCE AND PHOTOCHEMISTRY

- ☐ Tested successfully NIR for detection of explosives on surfaces.
- ☐ Established the optical properties of sunlight exposed TNT.
- ☐ Published 1 paper and submitted two additional manuscripts to peer review journals;
- ☐ Submitted two abstracts for SPIE Defense and Security Symposium;
- ☐ Established the N 1s binding energies in RDX

5. Component V:

SPECTROSCOPIC SIGNATURES OF LANDMINE EXPLOSIVES

- ☐ Graduated 25 MS students and 6 Ph.D. students.
- ☐ Studied polymorphism effects on ERCs signatures.
- ☐ Studied nucleation and crystallization properties of TNT and RDX.
- ☐ Began working on Fiber Optic Couple FTIR detection of explosives on surfaces.
- ☐ Used Chemometrics of spectroscopic measurements.
- ☐ Worked on nanotechnology based detection of explosives and other threat chemicals.
- ☐ Designed and developed a Raman based telescope system used in detection of explosives components of Improvised Explosive devices.
- ☐ Started taking data with the home built Raman based telescope system used in detection of explosives.
- ☐ Acquired two Deep Ultra Violet (DUV) Raman Spectrometers: one operating at fixed wavelengths: 244-248 nm and 257 nm. The second system is a triple monochromator Raman Spectrometer, which allowed for variable excitation laser in the DUV, Near UV (NUV) and VIS regions of the spectrum.
- ☐ Presented a component in Department of Homeland Security Center of Excellence for Explosives Detection, Mitigation and Response. The UPRM DoD-MURI Center for Chemical Sensors Development will be part of Northeastern University and University of Rhode Island jointly co-leads DHS-COE.
- ☐ Computational models of spectroscopic signatures: RDX, TNT, DNT, TATP.
- ☐ TNT adsorption properties measured.
- ☐ Calculations of soil-TNT interactions.
- ☐ Published second paper on vibrational spectroscopy standoff detection of explosives; published chapter on state of art of vibrational spectroscopy standoff detection of explosives.
- ☐ Started experiments on remote IR detection of explosives/homemade explosives

Technology Transfer

REPORT DOCUMENTATION PAGE			Form Approved OMB NO. 0704-0188
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Enclosure 1

FINAL PROGRESS REPORT – 4 FEBRUARY 2011

**ESTABLISHMENT OF A
CENTER FOR DEVELOPMENT OF CHEMICAL SENSORS FOR EXPLOSIVES
AT
UNIVERSITY OF PUERTO RICO – MAYAGÜEZ**

**MURI-ARO-NVL-DOD
Project P43567-CH-MUR-02148-1**

Samuel P. Hernández-Rivera

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Mayagüez, PR 00681-9000**

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A.	YEARLY EXPENDITURES COMPARISON	37

FINAL PROGRESS REPORT – 4 FEBRUARY 2011**EXECUTIVE SUMMARY**

DoD-UPRM-MURI grant: “Establishment of a Center for Development of Chemical Sensors for Explosives at University of Puerto Rico – Mayaguez” (Proposal # 43567CHMUR; Agreement #: DAAD190210257) operated between 2002 and 2010. The project established a multidisciplinary research center for detection of landmine explosives, focusing on spectroscopic signatures of landmines explosives and transport in soil, contributing to real time chemical sensing of landmines. Goals included:

- * Measurement of spectroscopic signatures of landmine explosives in soil;
- * Measurement of effect of environmental variables on explosives;
- * Studies of soil-explosives interactions: Raman and IR spectroscopies
- * Model transport behavior of explosives in soils under different environmental conditions.

The major accomplishments during 8 years of the DoD-MURI-UPRM CCSD:

1. COMPONENT I:**TRANSPORT PHENOMENA OF EXPLOSIVE COMPONENTS IN SOIL: PHYSICAL MODELING**

- Dissemination of results: results were presented at several scientific meetings. Several papers were published in peer review journals.
- Fate and transport experiments were conducted for 2-4 DNT and 2,4,6-TNT. Experimental work resulted in large amount of data used to advance scientific knowledge on the effect of environmental factors on the fate and transport of ERCs. The data also served to validate models used in the prediction of ERCs fate and transport.
- Technical accomplishments advance knowledge on fate and transport processes controlling the movement of TNT and DNT in water and vapor phases when subjected to variable environmental conditions, including: variable infiltration and evaporation events, light radiation, temperature, water flux, water content, vegetation, and boundary conditions.
- Diffusion, dissolution, sorption, and advective/dispersive properties were assessed for 2,4-DNT and 2,4,6-TNT under different environmental conditions.
- All physical models were built and instrumented. All lab-scale models and a field lysimeter are operational.
- Samplers and sampling methodology were developed for selectively sampling ERCs in the gas and liquid phase.
- Methods for analysis of large number of low-volume samples were developed.
- Fate and transport experiments were conducted for 2-4 DNT and 2,4,6-TNT.
- Two-Dimensional transport of TNT experiments were conducted under infiltration and evaporation conditions at different environmental conditions.
- TNT and DNT transport experiments were conducted in 3D laboratory-scale soil tanks under cyclic radiation and precipitation conditions.
- Effects of vegetation of fate, transport, and detection were studied.
- Diffusion, dissolution, sorption, and advective/dispersive properties were assessed for 2,4-DNT and 2,4,6-TNT under different environmental conditions.
- Field measurements and transport experiments were conducted.
- Twenty-two students from environmental, geotechnical, mechanical, chemical engineering, and soils were trained for the reported period on ERC fate and transport concepts in a multidisciplinary environment.

**2. COMPONENT II:
NUMERICAL MODELING OF TRANSPORT PHENOMENA OF LANDMINE EXPLOSIVES
AND DEGRADATION PRODUCTS IN SOIL**

- Dissemination of results was significant, including 7 publication, 6 oral presentations, and 8 posters at scientific meetings and workshops.
- The numerical code was completely validated.
- 1d, 2d, 3d situations has been studied and published or presented in scientific meetings.
- The effect of environmental parameters on the chemical signature of TNT was approached both numerically and experimentally.
- The adsorption of TNT and degradation products on organic matter (humic and fulvic acids) was numerically approached.

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I. REPORT DOCUMENTATION PAGE (SF298) (Continuation Sheet)

1. LIST OF PAPER DURING THE REPORTING PERIOD

A. PUBLICATIONS IN PEER REVIEW JOURNALS: 35

1. Espinosa-Fuentes, E.A., Peña-Quevedo, A.J., Pacheco-Londoño, L.C., Infante-Castillo, R. and Hernández-Rivera, S.P., A Review of Peroxide Based Homemade Explosives: Characterization and Detection, in "Explosive Materials: Classification, Composition and Properties", Janssen, T.J., ed., Chemical Engineering Methods and Technology Series, Nova Science Publishers, Inc. Hauppauge, NY, fourth quarter **2010**, ISBN: 978-1-61761-188-9.
2. Hernández-Rivera, S.P. and Castillo-Chará, J., *Ab initio*, DFT calculation and vibrational analysis of 2,4,6-trinitrotoluene, **2010**, *Vib. Spectrosc.* **53**: 248–259.
3. Hernández-Rivera, S.P., Pacheco-Londoño, L.C., Ortiz-Rivera, W., Castro-Suarez, J.R., O.M. Primera-Pedrozo and Félix-Rivera, H., Remote Raman and Infrared Spectroscopy Detection of High Explosives, in "Explosive Materials: Classification, Composition and Properties", Janssen, T.J., ed., Chemical Engineering Methods and Technology Series, Nova Science Publishers, Inc. Hauppauge, NY, fourth quarter **2010**, ISBN: 978-1-61761-188-9.
4. Pacheco-Londoño, L.C., Primera-Pedrozo, O.M., Hernández-Rivera, S.P., Evaluation of Samples and Standards of Energetic Materials on Surfaces by Grazing Angle-FTIR Spectroscopy in "Fourier Transform Infrared Spectroscopy: Developments, Techniques and Applications", Rees, O.J., ed., Chemical Engineering Methods and Technology Series, Nova Science Publishers, Inc. Hauppauge, NY, third quarter **2010**, ISBN: 978-1-61668-835-6.
5. Primera-Pedrozo, O.M., Soto-Feliciano, Y.M., Pacheco-Londoño, L.C., Hernández-Rivera, S.P., Fiber Optic-Coupled Grazing Angle Probe-Fourier Transform Reflection Absorption Infrared Spectroscopy for Analysis of Energetic Materials on Surfaces, in "Fourier Transform Infrared Spectroscopy: Developments, Techniques and Applications", Rees, O.J., ed., Chemical Engineering Methods and Technology Series, Nova Science Publishers, Inc. Hauppauge, NY, third quarter **2010**, ISBN: 978-1-61668-835-6.
6. Infante-Castillo, R. Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Vibrational spectra and structure of RDX and its ¹³C- and ¹⁵N-labelled derivatives: a theoretical and experimental study, **2010**, *Spectrochimica Acta-A*, **76** (2) 137-141. [doi:10.1016/j.saa.2010.02.051](https://doi.org/10.1016/j.saa.2010.02.051).
7. Peña-Quevedo, A.J., Laramée, J.A., Durst, H.D. and Hernández-Rivera, S.P., Cyclic Organic Peroxides Characterization by Mass Spectrometry and Raman Microscopy, *IEEE J. Sensors*, accepted, 2010.
8. Ortiz, W., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Standoff Raman Spectroscopy System for Detection of Chemical Warfare Agents Simulants and Toxic Industrial Compounds, *Sens Imaging*, 2010.
9. Ramírez-Cedeño, M.L., Félix-Rivera, H., Sánchez-Cuprill, R.A., Hernández-Rivera, S.P., Thermal-Spectroscopic Characterization of Acetone Peroxide and Acetone Peroxide Mixtures with Nitrocompounds, *J. Them. Anal. Cal.*, 2010.
10. Hernández-Rivera, S.P. and Castillo-Infante, R., A systematic theoretical investigation of the relationship between heats of detonation and NBO charges and 15N NMR chemical shifts of nitro groups in nitramines and nitro-paraffins, Computational and Theoretical Chemistry, 2010.

11. Félix-Rivera, H., Ramírez-Cedeño, M.L., Sánchez-Cuprill, R.A., Hernández-Rivera, S.P., Vapor Pressure and Enthalpy of Sublimation of Energetic Materials by Thermal Gravimetric Analysis, *Thermochim. Acta* 2010.
12. Wrable, M. Primera-Pedrozo, O.M., Hernández-Rivera, S.P. and Castillo-Chará, J., Interpretation of the surface-enhanced Raman spectrum of 2,4,6-trinitrotoluene using simple quantum chemistry models, *J. Undergrad. Chem. Res.* 2010.
13. Wrable-Rose, M. Primera-Pedrozo, O.M., Pacheco-Londoño, L.C. and Hernandez-Rivera, S.P., TNT, RDX and Ammonium Nitrate Standards on Gold-on-Silicon Surfaces by Thermal Inkjet Technology, *Sens Imaging.*, 2010.
14. Infante-Castillo, R. Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Monitoring the $\alpha \rightarrow \beta$ solid-solid phase transition of RDX with Raman spectroscopy: a theoretical and experimental study, **2010**, *J. Mol. Struct.*, **970** (1-3):51-58.
15. Rivera-Betancourt, O., Primera-Pedrozo, O.M., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., SERS and Density Functional Theory Study of o-Dinitrobenzene on Cu Nanoparticles, **2010**, *IEEE J. Sensors*, **10** (3): 69-706. doi: 10.1109/JSEN.2009.2038626.
16. Ramírez, M.L., Ortiz, W., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Remote Detection of Hazardous Liquids Concealed in Glass and Plastic Containers, **2010**, *IEEE J. Sensors*, **10** (3): 693-698. doi: 10.1109/JSEN.2009.2036373
17. Infante-Castillo, R., Hernández-Rivera, S.P., On the choice of optimal protocol for calculation of ^{13}C and ^{15}N NMR isotropic chemical shifts in nitramine systems, **2010**, *J. Mol. Struct.: THEOCHEM*, **940** (1-3):124-128. doi:[10.1016/j.theochem.2009.10.026](https://doi.org/10.1016/j.theochem.2009.10.026)
18. Irrazabal, M., Hernandez-Rivera, S.P., Briano, J.G., Modeling of TNT transport from landmines: Numerical approach", **2009**, *Chemosphere*, **77**: 546–551.
19. Primera-Pedrozo, O.M., Soto-Feliciano, Y.M., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., "Detection of High Explosives Using Reflection Absorption Infrared Spectroscopy with Fiber Coupled Grazing Angle Probe / FTIR", **2009**, *Sens. Imaging*, **10** (1): 1-13.
20. Pacheco-Londoño, L.C., Ortiz-Rivera, W., Primera-Pedrozo, O.M. and Hernandez-Rivera, S.P., "Vibrational Spectroscopy Standoff Detection of Explosives", **2009**, *Anal. Bioanal. Chem.*, **395**:323-335. DOI [10.1007/s00216-009-2954-y](https://doi.org/10.1007/s00216-009-2954-y).
21. Ramirez, M.L., Pacheco, L.C., Barreto M.A. and Hernández-Rivera, S.P., Enhanced Raman Detection using Spray-On Nanoparticles/Remote Sensed Raman Spectroscopy, in *Nanoscience and Nanotechnology for Chemical and Biological Defense*, R. Nagarajan, Walter Zukas, T. Alan Hatton, Stephen Lee, Eds., ACS Symposium Series # 1016, Ch. 10, pp. 131-140, Oxford University Press, New York, NY, **2009**.
22. Hernández-Rivera, S.P., Briano, J.G., de la Cruz-Montoya, E., Pérez-Acosta, G.A. and Jeréz-Rozo, J.I., Enhanced Raman Scattering of Nitroexplosives on Metal Oxides and Nanoparticles of Ag/TiO_2 , in *Nanoscience and Nanotechnology for Chemical and Biological Defense*, R. Nagarajan, Walter Zukas, T. Alan Hatton, Stephen Lee, Ed., ACS Symposium Series # 1016, Ch. 16, pp. 205-216, Oxford University Press, New York, NY, **2009**.
23. Chamoun-Emanuelli, A.M., Primera-Pedrozo, O.M., Barreto-Caban, M.A., Jerez-Rozo, J.I., and Samuel P. Hernández-Rivera, S.P., Enhanced Raman Scattering of TNT on Nanoparticles Substrates: Ag, Au and Bimetallic Au/Ag Colloidal Suspensions, in *Nanoscience and Nanotechnology for Chemical and Biological Defense*, R. Nagarajan, Walter Zukas, T. Alan Hatton, Stephen Lee, Eds., ACS Symposium Series # 1016, Ch. 17, pp. 217-232, Oxford University Press, New York, NY, **2009**.
24. Primera-Pedrozo, O. M.; Jerez-Rozo, J. I.; De La Cruz-Montoya, E.; Luna-Pineda, T.; Pacheco-Londono, L. C.; Hernández-Rivera, S. P., "Nanotechnology-Based Detection of Explosives and Biological Agents Simulants", **2008**, *IEEE J. Sensors*, **8**(6): 963-973. Digital Object Identifier 10.1109/JSEN.2008.9239.
25. Jerez-Rozo, J.I.; Primera-Pedrozo, O.M.; Barreto-Caban, M.A.; Hernandez-Rivera, S.P., "Enhanced Raman Scattering of 2,4,6-TNT Using Metallic Colloids", **2008**, *IEEE J. Sensors*, **8**(6): 974-982. Digital Object Identifier 10.1109/JSEN.2008.923229.
26. Primera-Pedrozo, O.M., Soto-Feliciano, Y.M., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., High Explosives Mixtures Detection Using Fiber Optics Coupled: Grazing

- Angle Probe/Fourier Transform Reflection Absorption Infrared Spectroscopy, **2008**, *Sens Imaging*, **9**(3-4): 27-40.
27. Hernández-Rivera, S.P., Pacheco-Londoño, L.C., Primera-Pedrozo, O.M., Ruiz, O., Soto-Feliciano, Y., Ortiz, W., Vibrational Spectroscopy of Chemical Agents Simulants, Degradation Products of Chemical Agents and Toxic Industrial Compounds, **2007**, *International Journal of High Speed Electronics and Systems* (IJHSES), **17**(4): 827-843.
 28. Gomez, L.M., Osorio, C., Amman, E., Hernandez, S.P. and Castro, M.E., The spectroscopic fingerprint of TNT between 395 and 495 nm determined from transmission near field optical microscopy measurements, **2006**, *Chem. Phys. Lett.*, **422**, 313–316.
 29. Alzate, L., Ramos, C.M., Hernández, N.M., Hernández, S.P. and Mina, N., "The Vibrational Spectroscopic Signature of TNT In Clay Minerals", **2006**, *Vibrational Spectroscopy*, **42**: 357-368.
 30. Alzate, L., Ramos, C.M., Hernández, N.M., Hernández, S.P. and Mina, N., "Density Functional Theory Treatment of the Structures and Vibrational Frequencies of 2,4- and 2,6-dinitrotoluenes", **2006**, *J. Mol. Struct.: Theochem*.
 31. Torres, P., Mercado, L., Cotte, I., Hernandez, S.P., Mina, N., Santana, A., Chamberlain, R.T., Lareau, R. and Castro, M.E., **2004**, "Vibrational Spectroscopy Study of β and α RDX Deposits", *J. Phys. Chem. B*, **108**: 8799-8805.
 32. Mercado, L., Torres, P., Gómez, L. M., Mina, N., Hernández, S. P., Lareau, R., Chamberlain, R. T. and Castro-Rosario, M.E., **2004**, "Synthesis and Characterization of High-Energy Nanoparticles", *J. Phys. Chem. B*, **108**: 12314-12317.
 33. Colon, Y., Ramos, C.M., Alzate, L., Castro, M.E., Hernández, S.P., Mina, N. Chamberlain, R.T., and Lareau, R.T., "Ion Mobility Spectrometry Determination of RDX on Surfaces", **2003**, *Int. J. Ion Mobil. Spectrom.* **6**.
 34. Y. Colon, C.M. Ramos, S. Rosario, M.E. Castro, S.P. Hernández, N. Mina, R.T. Chamberlain, and R. Lareau, "Ion Mobility Determination of Smokeless Powders on Surfaces", *Int. J. Ion Mobil. Spectrom.*, **5** (2002)3: 127-131.
 35. Mehta, N.K., Goenaga-Polo, J.E., Hernández-Rivera, S.P., and Hernández, D., Thomson, M.A. and Melling, P.J., "Development of an *In-Situ* Spectroscopic Method for Cleaning Validation Using Mid-IR Fiber Optics", **2003**, *Spectroscopy*, **April**, 18 (4),14-19.

B. PAPERS PUBLISHED IN NON-PEER-REVIEWED JOURNALS OR IN CONFERENCE PROCEEDINGS: 119

1. Irrazábal, M., Hernández-Rivera, S. P., Briano, J. G., "Modeling of the transport of explosive related compounds in soil", **2009**, in *Detection and Sensing of Mines, Explosive Objects, and Obscured Targets XIV*, edited by Russell S. Harmon, J. Thomas Broach, John H. Holloway Jr., *Proc. SPIE Int. Soc. Opt. Eng.*, **7303**: 730309-730315.
2. Peña-Quevedo, A. J., Hernández-Rivera, S. P., "Mass spectrometry analysis of hexamethylene triperoxide diamine by its decomposition products" **2009**, in *Detection and Sensing of Mines, Explosive Objects, and Obscured Targets XIV*, edited by Russell S. Harmon, J. Thomas Broach, John H. Holloway Jr., *Proc. SPIE Int. Soc. Opt. Eng.*, **7303**, 730303-730308.
3. Hwang, S., I. Y. Padilla, I. Feliciano, and J. Falcon, Transport and distribution of TNT and DNT in the presence of surface vegetation with *Fimbristylis cymosa*, **2009**, *Proc. of SPIE on Detection and Sensing of Mines, Explosive Objects, and Obscured Targets XIV*, Russell S. Harmon; J. Thomas Broach; John H. Holloway, Jr., Editors, Vol. 7303.
4. Anaya, A. and I. Y. Padilla, Interrelation Between Atmospheric Conditions and Detection of Explosive Relative Compounds Near Soil-Atmospheric Surfaces in Unsaturated Soil, Detection and Remediation Technologies for Mines and Minelike Targets XII, SPIE Defense and Security Symposium, Orlando, FL , April 13-17, **2009**.
5. Colón, E. and I.Y. Padilla, Climate Effect On The Fate, Transport and Detection of Explosive Signatures in a Sandy Soil Field Lysimeter, in Detection and Remediation Technologies for Mines and Minelike Targets XII, SPIE Defense and Security Symposium, Orlando, FL , April 13-17, **2009**.

6. Rivera, L. and I.Y. Padilla, Concentration Distribution of DNT and TNT around an Improvised Explosive Device in an Urban Environment, *in* Detection and Remediation Technologies for Mines and Minelike Targets XII, SPIE Defense and Security Symposium, Orlando, FL, April 13-17, **2009**.
7. Rivera, R. Environmental Effects on the Fate and Transport of Explosive-Related Compounds in Heterogeneous 3-D Clayey Soil's System, *in* Detection and Remediation Technologies for Mines and Minelike Targets XII, SPIE Defense and Security Symposium, Orlando, FL, April 13-17, **2009**.
8. Anaya, A. and I.Y. Padilla, Influence of Variable Environmental Conditions on Presence and Concentration of Energetic Chemicals Near Soil Surface in the Vadoze Zone, *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., Abstract H13A-0899, December 15-19, **2008**.
9. Pacheco-Londoño, L.C., Primera-Pedrozo, O.M., Ortiz, W., Castro, M.E. and Hernández-Rivera, S.P., "Modeling of Nitro Group in Explosives: Spectroscopic Measurements and Theoretical Calculations", **2007**, Proceedings of the 2007 IEEE Antennas and Propagation International Symposium, Honolulu, HI, June 10-14.
10. González, M. Peroza, C., Hernández, S.P. and Castro, M., "Nitroexplosives detection: from basic science to detection at a distance", **2007**, Proceedings of the 2007 IEEE Antennas and Propagation International Symposium, Honolulu, HI, June 10-14.
11. Castillo-Chará, J., Manrique-Bastidas, C., Mina, M., Castro, M.E., Hernández-Rivera, S.P., "Ab initio calculation of Raman vibrational signatures of 2,4-dinitrotoluene, 2,6-dinitrotoluene and 2,4,6-trinitrotoluene", **2007**, Chemical and Biological Sensors for Industrial and Environmental Monitoring III, Kenneth J. Ewing; James B. Gillespie; Pamela M. Chu; William J. Marinelli, Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **6756**, 67560G.
12. Luna-Pineda, T.; Soto-Feliciano, K.; De La Cruz-Montoya, E.; Pacheco-Londoño, L.C.; Ríos-Velázquez, C. and Hernández-Rivera, S.P.; "Spectroscopic characterization of biological agents using FTIR, normal Raman and Surface-Enhanced Raman spectroscopies", Chemical and Biological Sensing VIII, Augustus W. Fountain III, Editor, **2007**, *Proc. SPIE Int. Soc. Opt. Eng.*, **6554**, 65540K-655410K.
13. Jerez Rozo, J.I.; Chamoun, A.M.; Peña, S.L. and Hernández-Rivera, S.P.; "Enhanced Raman scattering of TNT on nanoparticle substrates: Ag colloids prepared by reduction with hydroxylamine hydrochloride and sodium citrate", Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense VI, Edward M. Carapezza, Editors, **2007**, *Proc. SPIE Int. Soc. Opt. Eng.*, **6538**, 653824-653835.
14. Ruiz-Pesante, O.; Pacheco-Londoño, L.C.; Primera-Pedrozo, O.M.; Ortiz, W.; Soto-Feliciano, Y.M.; Nieves, D.E.; Ramirez, M.L. and Hernández-Rivera, S.P.; "Detection of Simulants and Degradation Products of Chemical Warfare Agents by Vibrational Spectroscopy", **2007**, Chemical and Biological Sensing VIII, Augustus W. Fountain III, Editors, *Proc. SPIE Int. Soc. Opt. Eng.*, **6554**, 65540B.
15. Infante-Castillo, R. and Hernández-Rivera, S.P.; "Effects of isotopic substitution on the vibrational spectra of α -RDX", **2007**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense VI, Edward M. Carapezza, Editors, *Proc. SPIE Int. Soc. Opt. Eng.*, **6538**, 653825-653831.
16. De La Cruz-Montoya, E., Pérez-Acosta, G., Luna Pineda, T. and Hernández-Rivera, S.P.; "Surface enhanced Raman scattering of TNT and DNT on colloidal nanoparticles of Ag/TiO₂", **2007**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense VI, Edward M. Carapezza, Editors, *Proc. SPIE Int. Soc. Opt. Eng.*, **6538**, 653826-653835.
17. Peña-Luengas, S.L.; Jerez-Rozo, J.I.; Correa, S.N.; Peña, N.E. and Hernández-Rivera, S.P.; "Development of SPME-HPLC methodology for detection of nitroexplosives", **2007**, Detection and Remediation Technologies for Mines and Minelike Targets XII, Russell S. Harmon; J. Thomas Broach; John H. Holloway, Jr., Editors, **Proc. SPIE**, Vol. **6553**, 65531W-655312W.
18. Primera-Pedrozo, O.M.; Rodríguez, N.; Pacheco-Londoño, L. and Hernández-Rivera, S.P.; "Detection of 2,4,6-trinitrotoluene on non-traditional surfaces using fiber optic

- coupled grazing angle probe: FTIR”, **2007**, Infrared Technology and Applications XXXIII, Bjørn F. Andresen; Gabor F. Fulop; Paul R. Norton, Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, **6542**, 65423J-654232J.
19. Ramirez, M.L.; Ortiz, W.; Ruiz, O.; Pacheco-Londoño, L. and Hernández-Rivera, S.P.; “Detection of hazardous liquids concealed in glass, plastic, and aluminum containers”, **2007**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense VI, Edward M. Carapezza, Editors, *Proc. SPIE*, Vol. **6538**, 653827-653835.
 20. Peña-Quevedo, A.J.; Cody, R.; Mina-Camilde, N.; Ramos M. and Hernández-Rivera, S.P.; “Characterization and differentiation of high energy amine peroxides by direct analysis in real time TOF/MS”, **2007**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense VI, Edward M. Carapezza, Editors, *Proc. SPIE Int. Soc. Opt. Eng.*, **6538**, 653828-653839.
 21. Pacheco-Londoño, L.; Santiago, A.; Pujols, J.; Primera-Pedrozo, O.M.; Mattei, A.; Ortiz, W.; Ruiz, O.; Ramirez, M.L. and Hernández-Rivera, S.P.; **2007**, “Characterization of Layers of Tetra, TNB and HMX on Metal Surfaces Using Fiber Optics Coupled Grazing Angle-FTIR”, Infrared Technology and Applications XXXIII, Bjørn F. Andresen; Gabor F. Fulop; Paul R. Norton, Editors, *Proc. SPIE Int. Soc. Opt. Eng.*, **6542**, 65423K-65433K.
 22. Irrazábal, M.; Florián, V.; Castro, M.; Hernández-Rivera, S.P. and Briano, J.G.; “Effect of environmental parameters on the chemical signature of TNT in soil”, **2007**, Detection and Remediation Technologies for Mines and Minelike Targets XII, Russell S. Harmon; J. Thomas Broach; John H. Holloway, Jr., Editors, *Proc. SPIE Int. Soc. Opt. Eng.*, **6553**, 65531N-65541N.
 23. Pacheco-Londoño, L.C., Primera-Pedrozo, O.M., Ortiz, W., Castro, M.E. and Hernández-Rivera, S.P., “Modeling of Nitro Group in Explosives: Spectroscopic Measurements and Theoretical Calculations”, **2007**, Proceedings of the 2007 IEEE Antennas and Propagation International Symposium, Honolulu, HI, June 10-14.
 24. González, M., Peroza, C., Hernández, S.P. and Castro, M., “Nitroexplosives detection: from basic science to detection at a distance”, **2007**, Proceedings of the 2007 IEEE Antennas and Propagation International Symposium, Honolulu, HI, June 10-14.
 25. Castillo-Chará, J., Manrique-Bastidas, C., Mina, M., Castro, M.E., Hernández-Rivera, S.P., “*Ab initio* calculation of Raman vibrational signatures of 2,4-dinitrotoluene, 2,6-dinitrotoluene and 2,4,6-trinitrotoluene”, **2007**, Chemical and Biological Sensors for Industrial and Environmental Monitoring III, Kenneth J. Ewing; James B. Gillespie; Pamela M. Chu; William J. Marinelli, Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **6756**, 67560G.
 26. O.M. Primera-Pedrozo, Y.M. Soto-Feliciano, L.C. Pacheco-Londoño and S.P. Hernández-Rivera, “Fiber Optic Coupled-Reflection Absorption Infrared Spectroscopy (FO-RAIRS) as a Surface Analyzer of Traces Residues of Nitro Explosives on Surfaces”, Advanced Infrared Technology and Applications 9, Guanajuato, León, Mexico, October, **2007**.
 27. L.C. Pacheco-Londoño, O.M. Primera-Pedrozo, Y.M. Soto-Feliciano and S.P. Hernandez-Rivera, “Solvent Influence on Homogeneity of TNT Smearing Sample Preparation using Micro RAIRS Imaging”, Advanced Infrared Technology and Applications 9, Guanajuato, León, Mexico, October, **2007**.
 28. M. Gonzalez, S.P. Hernandez, and M.E. Castro, “X ray photoelectron spectroscopy of RDX on Si(110): Evidence for a new form of RDX”, 233rd American Chemical Society Meeting, Chicago, Illinois, March 25-29, **2007**.
 29. Theoretical calculations of DNT with siloxane site surface, Neiza M. Hernandez and Nairmen Mina, ACS National Meeting & Exposition, Chicago, March 28, **2007**.
 30. Density Functional Theory Treatment of the Structures and Vibrational Frequencies of 2,4- and 2,6-dinitrotoluenes, Neiza M. Hernandez and Nairmen Mina, ACS National Meeting & Exposition, Chicago, March 28, **2007**.
 31. J. I. Jeréz-Rozo, A.M. Chamoun and S.P. Hernandez-Rivera, Enhanced Raman Scattering of TNT on nanoparticles substrates: Ag and Au colloids and Au-Ag alloys, Nanoscience and Nanotechnology for Chemical and Biological Defense Symposium, 236th American Chemical Society National Meeting, Boston, MA, August, **2007**.

32. T. Luna-Pineda, K. Soto-Feliciano, C. Ríos-Velázquez and S.P. Hernández-Rivera, "Surface Enhanced Raman Spectroscopy Characterization of Biological Agents", Nanoscience and Nanotechnology for Chemical and Biological Defense Symposium, 236th American Chemical Society National Meeting, Boston, MA, August, **2007**.
33. A.J. Peña-Quevedo , R.B. Cody, N. Mina-Calmide, and S.P. Hernández-Rivera, Synthesis, *Characterization and Identification of Tetramethylene Diperoxide Dicarbamide by Direct Analysis Real Time –Mass Spectrometry and Vibrational Microscopy*, 235th American Chemical Society Meeting, Chicago, IL, March 25-29, **2007**.
34. Blanco, A., Pacheco-Londoño, L.C., Peña-Quevedo, A.J. and Hernández-Rivera, S.P., "UV Raman detection of 2,4-DNT in contact with sand particles", **2006**, Detection and Remediation Technologies for Mines and Minelike Targets XI; J. Thomas Broach, Russell S. Harmon, John H. Holloway, Jr.; Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, [6217](#), 621737-621746.
35. Ballesteros-Rueda, L.M., Herrera-Sandoval, G.M., Mina, N., Castro-Rosario, M.E., Briano, J.G. and Hernandez-Rivera, "Spectroscopic signatures of PETN: Part II. Detection in clay", **2006**, Detection and Remediation Technologies for Mines and Minelike Targets XI; J. Thomas Broach, Russell S. Harmon, John H. Holloway, Jr.; Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, [6217](#), 62173D-621712D.
36. Herrera-Sandoval, G.M., Ballesteros-Rueda, L.M., Mina-Camilde, N., Castro-Rosario, M.E., Briano, J.G. and Hernández-Rivera, S.P., "FT-IR signatures of TNT on montmorillonite-clay particles", **2006**, Detection and Remediation Technologies for Mines and Minelike Targets XI; J. Thomas Broach, Russell S. Harmon, John H. Holloway, Jr.; Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, [6217](#), 62173B-621713B.
37. Peroza, C.A., Osorio-Cantillo, C.M., Morales, M. Hernandez-Rivera, S.P. and Castro-Rosario, M.E., "Detection of TNT at a distance from analysis of backscattered radiation between 395 and 405 nm", **2006**, Detection and Remediation Technologies for Mines and Minelike Targets XI; J. Thomas Broach, Russell S. Harmon, John H. Holloway, Jr.; Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, [6217](#), 62171N.
38. Báez, B., Florián, V., Hernández-Rivera, S.P., Cabanzo, A. Correa, S.N., Irrazabal, M., Briano, J.G. and Castro, M.E., Detection of chemical signatures from TNT buried in sand at various ambient conditions: Phase II, **2006**, Detection and Remediation Technologies for Mines and Minelike Targets XI; J. Thomas Broach, Russell S. Harmon, John H. Holloway, Jr.; Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, [6217](#), 62171M-621710M.
39. Pacheco-Londoño, L.C., Primera-Pedrozo, O.M., Ramírez, M., Ruiz, O. and Hernández-Rivera, S.P., "Standoff infrared detection of explosives at laboratory scale", **2006**, Infrared Technology and Applications XXXII; Bjørn F. Andresen, Gabor F. Fulop, Paul R. Norton; Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, [6206](#), 620634-620641.
40. Barreto-Cabán, M.A., Pacheco-Londoño, L.C., Ramírez, M.L. and Hernández-Rivera, S.P., "Novel method for the preparation of explosive nanoparticles", **2006**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, [6201](#), 620129-620139.
41. Soto-Feliciano, Y., Primera-Pedrozo, O.M., Pacheco-Londoño, L.C. and Hernandez-Rivera, S.P., "Temperature dependence of detection limits of TNT on metallic surfaces using fiber optic coupled FTIR", **2006**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, [6201](#), 62012H-620110H.
42. Infante-Castillo, R. and Hernández-Rivera, S.P., "Theoretical and experimental vibrational and NMR studies of RDX", **2006**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, [6201](#), 62012F-62019F.
43. Peña-Quevedo, A.J., Mina-Calmide, N., Rodríguez, N., Nieves, D., Cody, R.B. and Hernández-Rivera, S.P., "Synthesis, characterization, and differentiation of high energy amine peroxides by MS and vibrational microscopy", **2006**, Sensors, and Command,

- Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, **6201**, 62012E-620111E.
44. Peña-Quevedo, A.J., Figueroa, J., Rodríguez, N., Nieves, D., Hernández, N., Rivera, R., Mina, N., and Hernández-Rivera, S.P., "Effect of water and common salts on the vibrational spectra of high energy cyclic organic peroxides", **2006**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, **6201**, 62012D-620112D.
 45. Balaguera-Gelves, M.R., El Burai-Félix, A., De La Cruz-Montoya, E., Jeréz Rozo, J.I. and Hernández-Rivera, "Silver metal colloidal film on a flexible polymer substrate", **2006**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, **6201**, 62012C-620110C.
 46. Ramírez, M.L., Pacheco-Londoño, L.C., Peña, A.J. and Hernández-Rivera, S.P., "Characterization of peroxide-based explosives by thermal analysis", **2006**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, **6201**, 62012B-620111A.
 47. Primera-Pedrozo, O.M., Soto-Feliciano, Y., Pacheco-Londoño, L.C., De La Torre-Quintana, L.F; and Hernandez-Rivera, S.P., "Detection of explosive mixtures on surfaces using grazing angle probe - FTIR: model for classification", **2006**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, **6201**, 62012A-62017A.
 48. De La Cruz-Montoya, E., Jeréz, J.I., Balaguera-Gelves, M., Luna-Pineda, T., Castro, M.E. and Hernández-Rivera, S.P., "Enhanced Raman spectroscopy of 2,4,6-TNT in Anatase and rutile titania nanocrystals", **2006**, Optics and Photonics in Global Homeland Security II; Theodore T. Saito, Daniel Lehrfeld; Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **6203**, 62030X-62036X.
 49. Jeréz Rozo, J. I., del Rocío Balaguera, M., Cabanzo, A., de la Cruz Montoya, E., Hernández-Rivera, S. P., "Enhanced Raman scattering of nitro-explosives on nanoparticles substrates: Au-Ag alloy, tin oxide, and scandium oxide" in *Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense V*, edited by Edward M. Carapezza, **2006**, *Proc. SPIE Int. Soc. Opt. Eng.*, **6201**, 62012G.
 50. Núñez-Quintero, D. and Hernández-Rivera, S.P., "Spectroscopic modeling of nitro group in explosives", **2006**, Independent Component Analyses, Wavelets, Unsupervised Smart Sensors, and Neural Networks IV; Harold H. Szu; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, **6247**, 62470Z-62479Z.
 51. Hernández, Miguel D., Ivonne Santiago, and Ingrid Padilla, Macro-Sorption of 2,4-Dinitrotoluene onto Sandy and Clayey Soils, Paper Number: 6217-132, in *Detection and Remediation Technologies for Mines and Minelike Targets XI*, SPIE Defense and Security Symposium, April 17-21 2006 in Orlando, FL, **2006**.
 52. Padilla, Amira, Ingrid Padilla, and Ivonne Santiago, Multiphase Extraction Sampling of Explosives in Unsaturated Soils, Paper Number: 6217-139, in *Detection and Remediation Technologies for Mines and Minelike Targets XI*, SPIE Defense and Security Symposium, April 17-21 2006 in Orlando, FL, **2006**.
 53. Anaya, Angel and Ingrid Padilla, 3D Laboratory-Scale SoilBed for Assessment of Fate and Transport of Explosive-Related Compounds in Soils Under Variable Environmental Conditions, Paper Number: 6217-135, in *on Detection and Remediation Technologies for Mines and Minelike Targets XI*, SPIE Defense and Security Symposium, April 17-21 2006 in Orlando, FL, **2006**.
 54. Molina, Gloria M., Ingrid Padilla, Miguel Pando, and Diego Perez, Field Lysimeters for the Study of Fate and Transport of Explosive Chemical in Soils Under Variable Environmental

- Conditions, Paper Number: 6217-137, in Detection and Remediation Technologies for Mines and Minelike Targets XI, SPIE Defense and Security Symposium, April 17-21 2006 in Orlando, FL, **2006**.
55. Rodríguez, Sylvia, Ingrid Padilla, and Ivonne Santiago, Development of a Multi-Scale Packing Methodology for Evaluating Fate and Transport Processes of Explosive-Related Chemicals in Soil Physical Models, Paper Number: 6217-77, in Detection and Remediation Technologies for Mines and Minelike Targets XI, SPIE Defense and Security Symposium, April 17-21 2006 in Orlando, FL, **2006**.
 56. S.P. Hernández-Rivera, O.M. Primera-Pedrozo, L. Pacheco-Londoño, O. Ruiz and Y. Soto-Feliciano, Standoff infrared detection of Chemical Warfare Agents Simulants and explosives at laboratory scale, 7th Joint Conference on Standoff Detection for Chemical and Biological Defense, Williamsburg, VA, October 23-27, **2006**.
 57. Pacheco-Londono, L., Primera-Pedrozo, O.M., de la Torre, L.F. and Hernandez-Rivera, S.P., "Determination of TATP, DNT, and TNT in air by FTIR and PLS-discriminant analysis", **2005**, Optical Pattern Recognition XVI, David P. Casasent, Tien-Hsin Chao; Eds, *Proc. SPIE Int. Soc. Opt. Eng.*, **5816**: 180-185.
 58. Florian, V., Cabanzo, A., Baez, B., Correa, Irrazabal, M., Briano, Castro, M.E. and Hernandez-Rivera, S.P., **2005**, "Detection of the spectroscopic signatures of explosives and their degradation products", Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5794**: 724-728.
 59. Manrique-Bastidas, C.A., Mina, N., Castro, M.E. and Hernandez-Rivera, S.P., "Raman microspectroscopy and FTIR crystallization studies of 2,4,6-TNT in soil", **2005**, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds. *Proc. SPIE Int. Soc. Opt. Eng.*, **5794**: 1358-1365.
 60. Rizo, O.L., Luna-Pineda, T., Cabanzo, A.C., Mendez, J., Hernandez-Rivera, S.P. and Castro-Rosario, M.E., "Microscopic mass transfer of TNT on soil", **2005**, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5794**: 1335-1345.
 61. Luna-Pineda, T., Gonzalez, L., Mendez, J., Cabanzo-Olarte, A.C., Rizo-Vivas, O.L., Hernandez-Rivera, S.P, Mina, N. and Castro-Rosario, M.E., "Studies of RDX interactions in soil", **2005**, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5794**: 1329-1334.
 62. Blanco, A., Mina, N., Castro, M.E., Castillo-Chara, J. and Hernandez-Rivera, S.P., "Effect of environmental conditions on the spectroscopic signature of DNT in sand", **2005**, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds. *Proc. SPIE Int. Soc. Opt. Eng.*, **5794**: 1281-1289.
 63. Correa, S.N., Baez, B.de Jesus Echevarria, M., Castro, M.E., Hernandez-Rivera, S.P., "Immersion mode SPME/ μ ECD/GC and TEEM-GC/MS for analysis of explosives buried in sand", **2005**, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5794**: 1272-1280.
 64. Baez, B., Correa, S.N. and Hernandez-Rivera, S.P., "Transport of explosives II: use of headspace-SPME/GC μ -ECD and TEEM GC/MS for detection of TNT vapors from sand buried samples", **2005**, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5794**: 1263-1271.
 65. Ballesteros, L.M., Herrera, G.M., Castro, M.E., Briano, J.G., Mina, N, Hernandez-Rivera, S.P., "Spectroscopic signatures of PETN in contact with sand particles", **2005**, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J.

- Thomas Broach, John H. Holloway, Jr.; Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, [5794](#): 1254-1262.
66. Herrera-Sandoval, G.M., Ballesteros, L.M., Mina, Briano, J., Castro, M.E. and Hernandez-Rivera, S.P., "Raman signatures of TNT in contact with sand particles", **2005**, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, [5794](#): 1245-1253.
 67. Alzate, L.F., Ramos, C.M., Hernandez, S.P. and Mina, N., "Ab initio treatment of the behavior of TNT in soil", **2005**, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, [5794](#): 1300-1309.
 68. Ramos, C.M., Alzate, L.F., Colon, Y.M., Hernandez, S.P. and Mina, N., "Computational modeling of the adsorption of 2,4-DNT on clay", **2005**, Detection and Remediation Technologies for Mines and Minelike Targets X; Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr.; Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, [5794](#): 1290-1299.
 69. Pacheco-Londoño, L., Primera, O.M., Ramírez, M., Ruiz O., and Hernandez-Rivera, S.P. **2005**, "Review of the Various Analytical Techniques and Algorithms for Detection and Quantification of TATP", Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense IV; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, [5778](#): 317-326, 2005.
 70. Balaguera, M.R., de La Cruz Montoya, E., Castro, M.E., Rivera-Montalvo, L.A., Hernandez-Rivera, S.P., **2005**, "Functionalization of nitroexplosives for surface-enhanced resonance Raman spectroscopy of silver colloids", Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense IV; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, [5778](#): 327-336.
 71. Primera-Pedrozo, O.M., Pacheco-Londono, L., Ruiz, O., Ramirez, M., Soto-Feliciano, Y.M., De La Torre-Quintana, L.F., Hernandez-Rivera, S.P., **2005**, "Characterization of thermal inkjet technology TNT deposits by fiber optic-grazing angle probe FTIR spectroscopy", Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense IV; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, [5778](#): 543-552.
 72. Pena, A.J., Pacheco-Londono, L., Figueroa, J., Rivera-Montalvo, L.A., Roman-Velazquez, F.R. and Hernandez-Rivera, S.P., "Characterization and differentiation of high energy cyclic organic peroxides by GC/FT-IR, GC-MS, FT-IR, and Raman microscopy", **2005**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense IV; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, [5778](#): 347-358.
 73. De La Cruz-Montoya, E., Blanco, A., Balaguera-Gelves, M., Pacheco-Londono, L. and Hernandez-Rivera, S.P., "Surface enhanced Raman scattering of nitroexplosives on nontraditional substrates", **2005**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense IV; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, [5778](#): 359-367.
 74. Hernandez, N.M., Rosario, S.V., Hernandez, S.P. and Mina, N., "Detection and characterization of smokeless powders with ion mobility spectrometry", **2005**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense IV; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, [5778](#): 607-616.
 75. Neiza M. Hernández, Liliana Alzate, Rosangela Rivera, Samuel P. Hernández, and Nairmen Mina, Theoretical calculations of RDX with siloxane site surface, ACS National Meeting & Exposition, Washington DC, August 28, **2005**.
 76. Yleana M. Colon, Rosangela Rivera, Neisa M. Hernández, Liliana Alzate, Samuel P. Hernández, and Nairmen Mina, Detection and characterization of smokeless powders with ion mobility spectrometry. ACS National Meeting & Exposition, Washington DC, August 28, **2005**.

77. Liliana F. Alzate, Rosángela Rivera, Neiza M. Hernandez, Samuel P. Hernandez, and Nairmen Mina, The Vibrational Spectroscopic Signature of TNT in Clay Minerals 3rd International Conference on Advance Vibrational Spectroscopy (ICAVS) Delavan, WI. September 13-20, **2005**.
78. Primera-Pedrozo, O.M., Pacheco-Londono, L.C., De la Torre-Quintana, L.F., Hernandez-Rivera, S.P., Chamberlain, R.T., Lareau, R.T., "Use of fiber optic coupled FT-IR in detection of explosives on surfaces", **2004**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense III; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, **5403**: 237-245.
79. Nieto, S., Santana, A., Hernandez-Rivera, S.P., Lareau, R.T., Chamberlain, R.T. and Castro-Rosario, M.E., "Quantum dots for detection of trace amount of nonvolatile explosives: the effect of TNT in the fluorescence of CdSe quantum dots", **2004**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense III; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, **5403**: 256-260.
80. Pacheco-Londono, L.C., De la Torre-Quintana, L.F., Primera-Pedrozo, O.M., Herrera, G.M., Ballesteros, L.M. and Hernandez-Rivera, S.P., "Molecular parameters and reactivity responsible for properties of nitro explosives", **2004**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense III; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, **5403**: 269-278.
81. Pacheco-Londono, L.C., Pena, L.C., Primera-Pedrozo, O.M., Hernandez-Rivera, S.P., Mina, N., Garcia, Chamberlain, R.T. and Lareau, R.T., "An experimental and theoretical study of the synthesis and vibrational spectroscopy of triacetone triperoxide (TATP)", **2004**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense III; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, **5403**: 279-287.
82. Torres, P.M., Gomez, L.M., Hernandez-Rivera, S.P., Lareau, R.T., Chamberlain, R.T., and Castro-Rosario, M.E., "Synthesis and characterization of high-energy nanoparticles", **2004**, Sensors, and Command, Control, Communications, and Intelligence (C3I) Technologies for Homeland Security and Homeland Defense III; Edward M. Carapezza; Ed., *Proc. SPIE Int. Soc. Opt. Eng.*, **5403**: 288-296.
83. Gomez, L.M., Santana, A., Hernandez-Rivera, S.P., and Castro, M.E., "Imaging and characterization of aerosol-deposited TNT nanoparticles: a near-field optical microscopy study", **2004**, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5415**: 468-473.
84. Hernandez-Rivera, S.P., Manrique-Bastidas, C.A., Blanco, A., Primera, O.M., Pacheco, L.C., Castillo-Chara, J., Castro, M.E., and Mina, N., "Spectroscopic characterization of nitroaromatic landmine signature explosives", **2004**, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5415**: 474-485.
85. Gomez, L.M. Santana, A., Mina, N., Hernández-Rivera, S.P., Castro, M.E., "Femtosecond laser UV photochemistry of TNT deposits: the role of hydroxyls", **2004**, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5415**: 486-493.
86. Baez, B., Correa, S.N., Hernández-Rivera, S.P., de Jesus, M., Castro, M.E., Mina, N., Briano, J.G., "Transport of explosives I: TNT in soil and its equilibrium vapor", **2004**, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5415**: 1389-1399.
87. Borrero, E.E., Briano, J.G., Castro, M.E. and Hernandez-Rivera, S.P. "Numerical simulation of the chemical-signature-compounds transport from a mine field", **2004**,

- Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5415**: 533-544.
88. Manrique-Bastidas, C.A., Castillo-Chará, J. Mina, N., Castro, M.E. and Hernández-Rivera, S.P., "Nucleation and crystallization studies: A vibrational spectroscopy investigation of 2,4,6-TNT", **2004**, Detection and Remediation Technologies for Mines and Minelike Targets IX; Russell S. Harmon, J. Thomas Broach and John H. Holloway, Jr., Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5415**: 1345-1356.
 89. Blanco, A., Mina, N., Castro, M.E., Castillo-Chara, J. and Hernandez-Rivera, S.P., "Spectroscopic investigation of the spectroscopic signatures of 2,4-DNT and 2,6-DNT: their interactions with sand particles", **2004**, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5415**: 1357-1366.
 90. Alzate, L.F., Colon, Y.M., Ramos, C.M., Santana, A., Hernández-Rivera, S.P., Castro, M.E., Briano, J.G., and Mina, N., "Density-functional-theory calculations of TNT and its interaction with siloxane sites of clay minerals", **2004**, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5415**: 1367-1376.
 91. Ramos, C.M., Alzate, L.F., Colon, Y.M., Santana, A., Hernandez-Rivera, S.P., Castro, M.E., Briano, J.G., and Mina, N., "Theoretical studies of the molecular structures of dinitrotoluenes and their interactions with siloxane site surface of clays", **2004**, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5415**: 1377-1388.
 92. Nieto, S., Gomez, L.M., Santana, A., Briano, J.G., Mina, N., Hernandez-Rivera, S.P. and Castro, M.E., "The chemistry of TNT on clean and hydroxyl-precovered Ottawa sand particles", **2004**, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5415**: 1400-1407.
 93. Colon, Y.M., Alzate, L.F., Ramos, C.M., Santana, A., Hernandez-Rivera, S.P., Miguel E. Castro, M.E., Munoz, M. and Mina, N., "Adsorption of RDX on clay", **2004**, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5415**: 1419-1430.
 94. Pacheco-Londoño, L.C. Primera-Pedrozo, O.M. and Hernández-Rivera, S.P., "Experimental and theoretical model of reactivity and vibrational detection modes of triacetone triperoxide (TATP) and homologues", **2004**, Optically Based Biological and Chemical Sensing for Defense, John C. Carrano and Arturas Zukauskas, Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5617**: 190-201.
 95. Manrique-Bastidas C.A., Primera-Pedrozo, O.M. Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., "Raman Microspectroscopy Crystallization Studies of 2,4,6-TNT in Different Solvents", **2004**, Optically Based Biological and Chemical Sensing for Defense, John C. Carrano and Arturas Zukauskas, Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5617**: 429-441.
 96. Nieto, S., Santana, A., Delgado, R., Hernandez, S.P., Chamberlain, R.T., Lareau, R., and Castro, M.E., "Nanoscaled Science and Engineering for Sensing: Quantum Dots Fluorescence Quenching for Organic NO₂ Sensing", **2004**, Nanotech, Vol. 3, Chapter 8, *Nanoparticles and Molecules*, **3(8)**: 399-401.
 97. Alzate, L.F., Ramos, C.M., Colón Y.M., Santana, A., Castillo, J., Hernández-Rivera, S.P., Castro, M.E., and Mina, N., "DFT calculations of TNT and its interaction with siloxane sites of clay minerals", 227th American Chemical Society Meeting, Anaheim, CA, March, **2004**.
 98. Ramos, C.M., Alzate, L.F., Colón Y.M., Santana, A., Castillo, J., Hernández-Rivera, S.P., Castro, M.E., and Mina, N., "DFT calculations of dinitrotoluenes and their interactions with soil", 227th American Chemical Society Meeting, Anaheim, CA, March, **2004**.

99. Blanco, A., Mina, N., Castro, M.E., Castillo-Chara, J. and Hernández-Rivera, S.P., "Vibrational Micro-Raman measurements of 2,4-DNT and 2,6-DNT and their interactions with sand particles", 227th American Chemical Society Meeting, Anaheim, CA, March, **2004**.
100. Manrique, C., Hernández, S.P., Castillo, J., Castro, M.E., Santana, A. and Mina, N., "Morphological and spectroscopic study of crystallization of TNT on metallic surfaces and in soil", 227th American Chemical Society Meeting, Anaheim, CA, March, **2004**.
101. Primera, O.M., Pacheco- Londoño, L.C., De la Torre, L.F., Hernández-Rivera, S.P., Chamberlain, R.T. and Lareau, R.T., "A novel method for the detection of triacetone triperoxide (TATP) on surfaces using Fiber Optic Coupled – FTIR", 227th American Chemical Society Meeting, Anaheim, CA, March, **2004**.
102. Gomez, L.M., Santana, A., Hernandez, S.P. and Castro, M.E., "One color femtosecond laser photochemistry of 2,4,6-Trinitrotoluene", Division of Physical Chemistry, 227th American Chemical Society Meeting, Anaheim, CA, March, 2004.
103. Nieto, S., Santana, A., Hernandez, S.P., Lareau, R.T., Chamberlain, R.T. and Castro, M.E., "The effect of nitro-organics in the fluorescence of dispersed colloidal particles: Off resonance femtosecond laser excitation of quantum dots as a tool for TNT detection", Division of Colloid and Surface Chemistry, 227th American Chemical Society Meeting, Anaheim, CA, March, **2004**.
104. Hernández-Rivera, S.P., Castro, M.E. and Mina, N., "Chemical Point Detection and Identification Using Vibrational Spectroscopy", 2nd Joint Conference on Point Detection for Chemical and Biological Defense, Williamsburg, VA, March 1-5, **2004**.
105. Borrero, E., Hernández, S.P., Castro, M.E. and Briano, J.G., "Transport of the chemical signature of buried UXO", 10th UXO Countermine Forum, St. Louis, MO, March, 2004.
106. Castro, M., "Quantum dots for trace explosive detection: the effect of TNT in the fluorescence of CdSe quantum dots", 3rd Micro Sensor Workshop, Arizona State University, Kerr Center, AZ, April 19-22, **2004**.
107. Torres, P.M., Mercado, L., Cotte, I., Mina, N., Hernandez, S.P., Lareau, R., Chamberlain, R.T. and Castro-Rosario, M.E., "The role of nanoparticles in beta RDX deposits", 225th ACS National Meeting, New Orleans, Louisiana, March **2004**.
108. Blanco, A., Castillo, J., Mina, J., Castro, M.E., Hernandez, S.P., "Vibrational Micro Raman measurements of 2,4-DNT and 2,6-DNT and their interactions with sand particles" 227th ACS National Meeting , Anaheim California, March 28 – April 2, **2004**.
109. Gomez, L.M., Hernandez, S.P., Mina, N., Santana, A., Lapointe, A., Grossman, S., Castro, M.E., "One color femtosecond laser photochemistry of 2,4,6 trinitrotoluene", 227th ACS National Meeting , Anaheim California, March 28 – April 2, **2004**.
110. Alzate, L.F., Ramos, C.M, Colón, Y.M, Santana, A., Castillo, J., Hernández-Rivera, S.P., Castro, M. E., and Mina, N., "DFT Calculations of TNT and its Interaction with Siloxane Sites of Clay Minerals", 227th ACS National Meeting , Anaheim California, March 28 – April 2, **2004**.
111. Ramos, C.M., Alzate, L.F., Colón, Y.M., Santana, A., Castillo, J., Hernández-Rivera, S.P., Castro, M. E., and Mina, N., "DFT Calculations of Dinitrotoluenes and Their Interactions with Soil", 227th ACS National Meeting , Anaheim California, March 28 – April 2, **2004**.
112. Mina, N., Cotte, I., Colon, Y., Ramos, C.M., Alzate, L.F., Hernandez-Rivera, S.P., Castro, M.E., Chamberlain, R.T. and Lareau, R.T., "Chemical spectroscopic signature for RDX-soil interactions", **2003**, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5089**: 1363-1374.
113. Torres, P., Mercado, L., Mortimer, L., Mina, N., Hernandez-Rivera, S.P., Lareau, R.T. Chamberlain, R.T., and Castro, M.E., "Raman and scanning electron microscopy measurements of RDX on glass substrates", **2003**, Detection and Remediation Technologies for Mines and Minelike Targets IX, Russell S. Harmon, J. Thomas Broach, John H. Holloway, Jr., Eds., *Proc. SPIE Int. Soc. Opt. Eng.*, **5089**: 1054-1064.
114. Correa, S.N., de Jesus, M. Mina, N., Castro, M.E., Blanco, A., Hernandez-Rivera, S.P., Cody, R. and Laramée, J. "Improved Detection of Landmine Components: Using TEEM-

- GC-MS for Detection of TNT and RDX in Soil and Other Complex Matrices”, **2003**, Detection and Remediation Technologies for Mines and Minelike Targets VIII, Russell S. Harmon, John Holloway Jr. and J.T. Broach, Editors, *Proc. SPIE Int. Soc. Opt. Eng.*, **5089**: 1001-1009.
115. Correa, S.N., De Jesús, M., Mina, N., Castro, M.E., Blanco, A., Hernández-Rivera, S.P., Cody, R.B., and Laramée, J.A. “Comparison of SPME GC/MSD with SPME-TEEM-GC/MS in Analysis of Explosives in Complex Matrices”, **2003**, 226th American Chemical Society Meeting, Symposium Papers Presented Before the Division of Environmental Chemistry Division, American Chemical Society, **43**: 2, New York, N.Y.
 116. Gomez, L.M., Hernandez, S.P., Mina, N. and Castro, M.E., “Synthesis and Characterization of Monodispersed 300 nm RDX Nanoparticle”, 226th ACS National Meeting, September 7-11, **2003**.
 117. Perla M. Torres, N. Mina, Samuel P. Hernandez, Miguel E. Castro, Richard Lareau, and R.Thomas Chamberlain, “Nanoexplosives: The role of nanoparticles in beta RDX polymorphs”, American Chemical Society, 225th ACS National Meeting, New Orleans, LA, March 23-27, **2003**.
 118. S.P. Hernandez-Rivera, “Use of *in-situ* Spectroscopic Method for Cleaning Validation Using Mid-IR Fiber Optics/FT-IR Probes to Significantly Decrease Cycle Times”, *Implementation of Process Analytical Technologies in the pharmaceutical and biotech industries*, Washington, DC, Feb. **2003**.
 119. I. Cotte, Y. Colon, S.P. Hernandez, M.E. Castro and N. Mina, “FT-IR AND Raman Spectroscopy Studies Of RDX-Surfaces Interactions And IMS Recovery Efficiency”, 224th ACS National Meeting, Boston, MA August **2002**.

D. PAPERS PRESENTED AT MEETINGS BUT NOT PUBLISHED IN CONFERENCE PROCEEDINGS: **229**

1. Castro-Suarez, J.R., Pacheco-Londoño, L.C., Hernandez-Rivera, S.P., Diem, M. and Vélez, M., Standoff Detection of Explosives using FTIR Telescope, 2010 International Symposium on Spectral Sensing Research (ISSR) Conference, University Plaza, Hotel & Convention Center, Springfield, MO, June 21-24, **2010**.
2. Rivera-Betancourt, O.E., Arroyo-Oquendo, A., Hernandez-Gonzalez, J. and Hernández-Rivera, S.P., Employing Laser Treatment to Study Structural Effects of Bimetallic Particles and Potential Applications in SERS Detection of High Explosives, 2010 International Symposium on Spectral Sensing Research (ISSR) Conference, University Plaza, Hotel & Convention Center, Springfield, MO, June 21-24, **2010**.
3. Nieves-Colon, G.A., Pacheco-Londono, L.C., Primera-Pedrozo, O.M. and Hernández-Rivera, S.P., Quantification of TNT, DNT and PETN on Glass Substrate by Fiber Optic-Grazing Angle Probe FTIR Spectroscopy, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, **2010**.
4. Rodríguez-González, G.M., Martínez-García, M., Félix-Rivera, H., Soto-Feliciano, K., Primera-Pedrozo, O.M. and Hernández-Rivera, S.P., *Bacillus thuringiensis* Detection and Characterization by Normal Raman and SERS at the Stationary Growth Stage, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, **2010**.
5. Herrera-Sandoval, G.M., Marrero L., Vega, V. and Hernández-Rivera, S.P., SERS Effect of Silver Nanoparticles obtained by Laser Ablation, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, **2010**.
6. Lasanta-Pagán, K., Espinosa, E., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Novel Synthesis of DADP, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, **2010**.
7. Balaguera-Gelves, M.R. and Hernández-Rivera, S.P., Low Temperature Aqueous Synthesis of ZnO Nanorods for Enhanced Raman Spectroscopy, Northeast Alliance for

- Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, **2010**.
8. Wrangle-Rose, M., Primera-Pedrozo, O.M., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Preparation of Energetic Materials Standards, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, **2010**.
 9. Granda-Paz, N. Granda-Marulanda, L. and Hernández-Rivera, S.P., Kinetics of the degradation of aqueous TNT solutions using metallic iron nanoparticles, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, **2010**.
 10. Rivera-Betancourt, O.E. and Hernández-Rivera, S.P., Employing Pulsed Laser Treatment to Study Structural Effects of Bimetallic Au/Cu Particles and Potential Applications in SERS, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, **2010**.
 11. Gonzalez-Sosa, R., Ortiz Rivera, W. and Hernández-Rivera, S.P., Surface Enhanced Raman Spectroscopy of Yeast as Model for Biological Threats Detection, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, **2010**.
 12. Sanchez-Cuprill, R., Félix-Rivera, H., Ramirez-Cedeño, M.L. and Hernández-Rivera, S.P., Thermal Gravimetric Analysis for Vapor Pressure and Sublimation Enthalpy of Acetone Peroxide and other Energetic Materials, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, **2010**.
 13. Rivera, J.K., Soto, N.M., Corera, S.N. and Hernández-Rivera, S.P., Using Caribbean Plants for Remediation of TNT in Aqueous Medium, Northeast Alliance for Graduate Education and the Professoriate, NEA Science Day, Mayaguez, PR, February 11, **2010**.
 14. Nieves-Colon, G.A., Pacheco-Londono, L.C., Primera- Pedrozo, O.M. and Hernández-Rivera S.P., Quantification of TNT, DNT and PETN on Glass Substrate by Fiber Optic-Grazing Angle Probe FTIR Spectroscopy, 30th Puerto Rico Interdisciplinary Scientific Meeting, 45th Junior Technical Meeting, University of Puerto Rico-Rio Piedras Campus, Saturday March, **2010**.
 15. Espinosa-Fuentes, E.A., Hidalgo-Rivera, M., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Experimental and DFT Study of the Mechanism of Acetone-Peroxide Formation Reaction, XV Sigma Xi Student Poster Day, Lobby, Chemistry Building, University of Puerto Rico at Mayagüez, Thursday, April 8th, **2010**.
 16. Wrangle-Rose, M.R., Primera-Pedrozo, O.M., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P. Preparation of TNT and RDX Standards by Smearing and Thermal Inkjet Technologies on Gold-on-Silicon and Glass Surfaces, XV Sigma Xi Student Poster Day, Lobby, Chemistry Building, University of Puerto Rico at Mayagüez, Thursday, April 8th, **2010**.
 17. Rivera-Betancourt, O.E., Arroyo-Oquendo, A., Hernandez-Gonzalez, J. and Hernández-Rivera, S.P., Employing Laser Treatment to Study Structural Effects of Bimetallic Particles and Potential Applications in SERS Detection of High Explosives, XV Sigma Xi Student Poster Day, Lobby, Chemistry Building, University of Puerto Rico at Mayagüez, Thursday, April 8th, **2010**.
 18. Marrero-Vilches, L., Herrera-Sandoval, G.M. Vega, V. and Hernández-Rivera, S.P., Photodegradation of Explosives with Iron Oxide as Catalyst, 30th Puerto Rico Interdisciplinary Scientific Meeting, 45th Junior Technical Meeting, University of Puerto Rico-Rio Piedras Campus, Saturday March, **2010**.
 19. Ruiz-Caballero, J.L., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Solvation Models of RDX in Alcohols, XXXV Congress of Theoretical Chemists of Latin Expression, QUITEL 2009, San Andrés Island, Colombia, September 17-19, **2009**.
 20. Pacheco-Londoño, L.C., Ruiz-Caballero, J.L. and Hernández-Rivera, S.P., Theoretical Calculation of Raman Resonances and Pre-Resonances for Diatomic Molecules, XXXV Congress of Theoretical Chemists of Latin Expression, QUITEL 2009, San Andrés Island, Colombia, September 17-19, **2009**.

21. Primera-Pedrozo, O.M., Chamoun-Emanuelli, A.M., Medina-Ramos, W., Rivera, A. and Hernandez-Rivera, S.P., Synthesis and Assembly of Short and Long Gold Nanorods for Nitroexplosives Detection: A Surface Enhanced Raman Spectroscopy Study, Nanoelectronic Devices for Defense and Security Conference (NANO-DDS), Fort Lauderdale, Florida, September 27 – October 2, **2009**.
22. Balaguera-Gelves, M.R., Perales-Pérez, O., Tomar, M. and Hernández-Rivera, S.P., Low-Temperature Aqueous Synthesis of ZnO Nanorods and ZnO (Au, Al, Ag) Nanocomposites for Enhanced Raman Spectroscopy, Nanoelectronic Devices for Defense and Security Conference (NANO-DDS), Fort Lauderdale, Florida, September 27 – October 2, **2009**.
23. Rivera-Betancourt, O.E., Martinez, R.I., Resto, O. and Hernández-Rivera, S.P., Synthesis of Gold Covered Copper Particles by Chemical and Laser Reduction Techniques and Applications to Surface Enhanced Raman Spectroscopy (SERS), Nanoelectronic Devices for Defense and Security Conference (NANO-DDS), Fort Lauderdale, Florida, September 27 – October 2, **2009**.
24. Souto-Melgar, N., Pacheco-Londoño, L.C., Souto-Bachiller, F.A., Hernández-Rivera, S.P. and Briano, J.G., Surface Enhanced Raman Scattering of TNT Via TiO₂ Au Nanocomposites, Nanoelectronic Devices for Defense and Security Conference (NANO-DDS), Fort Lauderdale, Florida, September 27 – October 2, **2009**.
25. Félix, H., Ramírez, M.L. and Hernández-Rivera, S.P., Thermal-Spectroscopic Characterization of Acetone Peroxide Mixtures with Nitroexplosives, 10th annual Gordon-CenSSIS/ALERT Research & Industrial Collaboration Conference (RICC), Northeastern University in Boston, MA, October 27-28, **2009**.
26. Pacheco-Londoño, L.C., Ramírez, M.L., Infante-Castillo, R., Primera-Pedrozo, O.M. and Hernández-Rivera, S.P., Sublimation Kinetics of 2,4-DNT, TATP, TNT and RDX by Grazing Angle Probe, Fiber Optic Coupled FTIR Spectroscopy and Thermal Gravimetric Analysis, 10th annual Gordon-CenSSIS/ALERT Research & Industrial Collaboration Conference (RICC), Northeastern University in Boston, MA, October 27-28, **2009**.
27. Félix, H., Rodríguez, G., Martínez, R., Primera, O.M., Ríos, C. and Hernández-Rivera, S.P., *Bacillus Thuringensis* Detection and Characterization by Normal Raman at Different Grow Stages, 10th annual Gordon-CenSSIS/ALERT Research & Industrial Collaboration Conference (RICC), Northeastern University in Boston, MA, October 27-28, **2009**.
28. Sabine, L.M., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Induced Growth of Au and Ag Nanostructures by Laser Beams for Detection of Target Analytes, 10th annual Gordon-CenSSIS/ALERT Research & Industrial Collaboration Conference (RICC), Northeastern University in Boston, MA, October 27-28, **2009**.
29. Gaensbauer, N., Rivera-Betancourt, O.E., Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Raman Based Detection of Hazardous Liquids Concealed in Liquid Consumer Products, 10th annual Gordon-CenSSIS/ALERT Research & Industrial Collaboration Conference (RICC), Northeastern University in Boston, MA, October 27-28, **2009**.
30. Rivera-Betancourt, O.E., Martinez¹, Oscar Resto, O. and Hernandez-Rivera, S.P., Synthesis of Gold Covered Copper Particles by Chemical and Laser Reduction Techniques and Applications to Surface Enhanced Raman Spectroscopy, 10th annual Gordon-CenSSIS/ALERT Research & Industrial Collaboration Conference (RICC), Northeastern University in Boston, MA, October 27-28, **2009**.
31. Primera-Pedrozo, O.M., Souto-Melgar, N., Chamoun-Emanuelli, A., Resto, Briano, J.G., Souto, F.A. and Hernandez-Rivera, S.P., Toward the Synthesis of New Surface Enhanced Raman Spectroscopy Substrates for Nitroexplosives Detection, 10th annual Gordon-CenSSIS/ALERT Research & Industrial Collaboration Conference (RICC), Northeastern University in Boston, MA, October 27-28, **2009**.
32. Castañer de Choudens, J., Herrera, G.M. and Hernández-Rivera, S.P., Synthesis of iron oxide and study of photocatalytic activity. Northeast Alliance for graduate Education and the Professoriate, NEA Science Day – Mayaguez, Puerto Rico – March 12, **2009**.

33. Hidalgo-Santiago M., Eduardo Espinosa-Fuentes, Leonardo Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Experimental and Theoretical Study of the Mechanism of Acetone-Peroxide Reaction using Raman Spectroscopy, Synthesis of iron oxide and study of photocatalytic activity, Northeast Alliance for graduate Education and the Professoriate, NEA Science Day – Mayaguez, Puerto Rico – March 12, **2009**.
34. Granda-Marulanda, L., Granda-Paz, N. and Hernández, S.P., Evaluation of Adsorption Capacity of Treated Tire Rubber for TNT Removal, Northeast Alliance for graduate Education and the Professoriate, NEA Science Day – Mayaguez, Puerto Rico – March 12, **2009**.
35. Vega, V., Báez, B., Herrera, G.M. and Hernández-Rivera, S.P., Titanium Dioxide Modified Expanded Polystyrene for Removal of Persistent Contaminants, Northeast Alliance for graduate Education and the Professoriate, NEA Science Day – Mayaguez, Puerto Rico – March 12, **2009**.
36. Lasanta-Pagán, K.Y., Nieves-Colón, G., Ramírez, M.L., Pacheco-Londoño L.C. and Hernández-Rivera, S.P., Detection of Chemical and Biological threats Concealed in Commonly Consumed Products using Fiber Coupled Raman Spectroscopy, Northeast Alliance for graduate Education and the Professoriate, NEA Science Day – Mayaguez, Puerto Rico – March 12, **2009**.
37. Álvarez, E.L., Correa, S.N., Barreto, E.S., Souto, F. and Hernández-Rivera, S.P., Removal of TNT from liquid medium using different plants, Northeast Alliance for graduate Education and the Professoriate, NEA Science Day – Mayaguez, Puerto Rico – March 12, **2009**.
38. Félix-Rivera, H., Pacheco-Londoño, L.C., Ortiz-Rivera, W., Espinoza-Fuentes, E. and Hernández-Rivera, S.P., Gas Phase Remote Detection of Explosives using Nano-CARS, Northeast Alliance for graduate Education and the Professoriate, NEA Science Day – Mayaguez, Puerto Rico – March 12, **2009**.
39. Ramírez, M.L., Pacheco-Londoño, L.C., Primera-Pedrozo, O.M. Ortiz, W., Ruiz, O. and Hernandez-Rivera, S.P., Application of Vibrational Spectroscopy to Detection of Chemical Warfare Agents and Related Chemicals, Third Annual U.S. Department of Homeland Security (DHS) Annual University Network Summit, Washington, DC, March, **2009**.
40. Félix, H., Ramírez, M.L., Pacheco-Londoño, L.C., Primera-Pedrozo, O.M. and Hernandez-Rivera, S.P., Implementation of Sensor Evaluation Activity for Explosive Detection Course, Third Annual U.S. Department of Homeland Security (DHS) Annual University Network Summit, Washington, DC, March, **2009**.
41. Rivera-Betancourt, O.E., Primera-Pedrozo, O.M. Pacheco-Londoño, L.C. and Hernández-Rivera, S.P., Educational Perspective: Use of Surface Enhanced Raman Spectroscopy (SERS) For the Detection of Explosives and Threat Agents, Third Annual U.S. Department of Homeland Security (DHS) Annual University Network Summit, Washington, DC, March, **2009**.
42. Ruiz-Pesante, O., Ortiz, W. and Hernández-Rivera, S.P., Detection of Chemical Warfare Agent Simulants (CWAS) and Degradation Products of Chemical Agents using Raman Spectroscopy, Third Annual U.S. Department of Homeland Security (DHS) Annual University Network Summit, Washington, DC, March, **2009**.
43. Primera-Pedrozo, O.M., Chamoun-Emanueli, A.M., Rivera-Betancourt, O.E., Pacheco-Londoño, L.C., Fierro, P.M. and Hernández-Rivera, Nanotechnology and Surface Enhanced Raman Spectroscopy (SERS): Powerful Forms to Detect Explosives, Third Annual U.S. Department of Homeland Security (DHS) Annual University Network Summit, Washington, DC, March, **2009**.
44. Caraballo, Cynthia, Ingrid Padilla, Rafael Rivera, Jose A. Santiago, Environmental Monitoring of energetic chemicals in water and soils, AIChE Annual Meeting, Philadelphia, PA, November 16-21, **2008**.
45. S.P. Hernández-Rivera, Undergraduate Students and Graduate Students, “Center for Chemical Sensors: Overview of Program”, 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.

46. A.J. Peña-Quevedo, Robert B. Cody, James Laramée, Michael Nilles, Dupont Durst, Samuel P. Hernández-Rivera, Novel methodology for energetic organic peroxides analysis: Direct analysis in real time-TOF- MS, ISSSR 2008, Hoboken, NJ, June **2008**.
47. O.E. Rivera-Betancourt, E. Espinosa and S.P. Hernández-Rivera, "Raman scattering study of *o*- and *p*-dinitrobenzenes on the surface of Cu nanoparticles with visible excitation and Density Functional Theory", ISSSR 2008, Hoboken, NJ, June **2008**.
48. L.C. Pacheco-Londoño, W. Ortiz, O.M. Primera-Pedrozo and S.P. Hernández-Rivera, Standoff Raman Detection of Explosives, ISSSR 2008, Hoboken, NJ, June, **2008**.
49. M.L. Ramirez, W Ortiz, L.C. Pacheco-Londoño and S.P. Hernández-Rivera, Remote Detection of Hazardous Liquids Concealed in Glass and Plastic Containers, ISSSR 2008, Hoboken, NJ, June **2008**.
50. W.Ortiz-Rivera, L.C. Pacheco-Londoño and S.P. Hernández-Rivera, Standoff Raman Spectroscopy System for Detection of Explosives, Chemical Warfare Agents Simulants and Toxic Industrial Compounds, ISSSR 2008, Hoboken, NJ, June, **2008**.
51. A.J. Peña-Quevedo, R.B. Cody, S.P. Hernández-Rivera, "Mass Spectrometry Analysis of Dibenzoyl Peroxide by DART-TOFMS", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.
52. L.C. Pacheco-Londoño, W. Ortiz-Rivera, O.M. Primera-Pedrozo and S.P. Hernández-Rivera, "Remote Raman Detection and Quantification of RDX Particles in C4 by Chemometrics using Three Different Excitation Lines", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.
53. O.E. Rivera-Betancourt, R. Martínez-García, O.M. Primera-Pedrozo, Leonardo C. Pacheco-Londoño and Samuel P. Hernández-Rivera, "SERS and Density Functional Theory Study of *o*-Dinitrobenzene on Cu Nanoparticles", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.
54. S. Soto-Medina, L.C. Pacheco-Londoño and S.P. Hernández-Rivera, "Synthesis of Nanoparticles Ag-Au, Ag-Ag₂S-Au and Ag-Au₂S-Au", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.
55. W. Medina-Ramos, A.M. Chamoun-Emanuelli, O.M. Primera-Pedrozo, A. Rivera, L.F. De La Torre-Quintana, and S.P. Hernández-Rivera, "Self Assembly of Gold Nanorods at the Cyclohexane/Water Interface for TNT Detection", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.
56. W. Ortiz-Rivera, Leonardo C. Pacheco-Londoño and S.P. Hernández-Rivera, "Remote Raman System for Detection of Chemical Warfare Agents Simulants and Toxic Industrial Compounds", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.
57. R. Infante-Castillo and S.P. Hernández-Rivera, "¹³C and ¹⁵N NMR Chemical Shifts Calculations on Nitramine Systems: A Comparison of Methods and Basis Sets", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.
58. A.J. Peña-Quevedo and S. P. Hernández-Rivera, "Trace Identification of HMTD by API-TOF-MS", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.
59. A. Rivera-Velez, O.M. Primera-Pedrozo, M. Mulhern and S.P. Hernández-Rivera, "Synthesis of Gold Nanocubes for detection of DNA molecules using Surface-Enhanced Raman Spectroscopy (SERS) Applications", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.
60. A.M. Chamoun-Emanuelli, W. Medina-Ramos, A. Rivera, O.M. Primera-Pedrozo and S.P. Hernández-Rivera, "Self Assembly of Gold Nanorods at a Cyclohexane/Water interface for 2,4,6-TNT Detection", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.
61. D.B. Báez, G. Rodríguez, M. Vega and S.P. Hernández-Rivera, "Recycling of Expanded Polystyrene to Remove Organic Pollutants from Water", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.
62. G.M. Herrera and S.P. Hernández-Rivera, "Study of SERS Effect of Iron Oxide and its Photocatalytic Activity with Ortho-Nitrophenol as Contaminant", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, 2008.

63. J.L. Ruiz-Caballero, L.C. Pacheco and S.P. Hernández-Rivera, "Solubility Determination and Theoretical Modeling of RDX in Different Alcohols", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.
64. M.R. Balaguera-Gelves, I.J. Rodríguez, O. Perales-Perez, M. Tomar and S.P. Hernández-Rivera, "Low-temperature aqueous synthesis of ZnO micro-rods and ZnO- Au nanocomposites", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.
65. N. Granda-Paz, L. Granda-Marulanda and S.P. Hernández-Rivera, "Adsorption of 2,4,6-Trinitrotoluene from Aqueous Solutions using a Char Obtained from Pyrolyzed Waste-Tire Rubber", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.
66. R. Infante-Castillo and S.P. Hernández-Rivera, "Applicability of ATR-FTIR and Optical Density to the Study of Media-Ink Interaction in Inkjet Printing", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.
67. S.L. Peña, M. Vega and S. P. Hernández-Rivera, "Detection of explosives by Liquid Chromatography", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.
68. S.N. Correa, E.L. Alvarez, E.S. Barreto, F. Souto-Bachiller and S.P. Hernandez-Rivera, "Comparison of TNT Removal from Aqueous Medium Using Different Plants", 32nd Senior Technical Meeting, PR ACS Section, Rincón, PR, Nov. 21, **2008**.
69. L.C. Pacheco-Londoño, O.M. Primera-Pedrozo, M.L. Ramírez, W. Ortiz and S.P. Hernández-Rivera, "Standoff Vibrational Detection and Their Figures of Merit", ALERT-DHS-COE Kickoff Meeting, Northeastern University, Boston, MA, Nov. 29-30, **2008**.
70. M.L. Ramírez, L.C. Pacheco-Londoño, O.M. Primera-Pedrozo, W. Ortiz, M. Barreto-Caban, P. Fierro and S.P. Hernández-Rivera, "Explosives Contamination Simulation by Nanoparticles Sprayers: Preparing Explosive Contamination Standards", ALERT-DHS-COE Kickoff Meeting, Northeastern University, Boston, MA, Nov. 29-30, **2008**.
71. O. M. Primera-Pedrozo, O.E. Rivera-Betancourt, W. Ortiz, A.M. Chamoun-Emanuelli, W. Medina-Ramos, A. Rivera, L.C. Pacheco-Londoño, P. Fierro-Mercado and S.P. Hernández-Rivera, "Silver, Gold, and Copper Nanoparticles for Homeland Security Applications: Surface Enhanced Raman Spectroscopy Detection of Explosives and other Threat Chemicals", ALERT-DHS-COE Kickoff Meeting, Northeastern University, Boston, MA, Nov. 29-30, **2008**.
72. Samuel P. Hernández-Rivera, Standoff Detection of Explosives Using a Raman Telescope, 11th Annual Landmine Detection Research Review Meeting, Springfield, VA, 29-30 January, **2008**.
73. M.L. Ramírez, W. Ortiz, O. Ruiz, L.C. Pacheco-Londoño and S.P. Hernández-Rivera, "Raman Based Bottle Screener for Concealed Hazardous Liquids", ALERT-DHS-COE Kickoff Meeting, Northeastern University, Boston, MA, Nov. 29-30, **2008**.
74. Nelson Granda-Paz, Samuel P. Hernández-Rivera, L. Granda-Marulanda, A. Torres and I. Otero, Adsorption of 2,4,6-trinitrotoluene from aqueous solutions using untreated and pyrolyzed tire rubber, 235th American Chemical Society Meeting, New Orleans, LA, April, **2008**.
75. Alvaro J. Peña-Quevedo, Robert B. Cody, James Laramée, Michael Niles, Dupont Durst, Samuel P. Hernández-Rivera, Novel methodology for energetic organic peroxides analysis: Direct analysis in real time-TOF- MS, ISSSR 2008, Hoboken, NJ, June **2008**.
76. Omar E. Rivera-Betancourt, E. Espinosa and S.P. Hernández-Rivera, Raman scattering study of *o*- and *p*-dinitrobenzenes on the surface of Cu nanoparticles with visible excitation and Density Functional Theory, ISSSR 2008, Hoboken, NJ, June **2008**.
77. Leonardo C. Pacheco-Londoño, W. Ortiz, O.M. Primera-Pedrozo and S.P. Hernández-Rivera, Standoff Raman Detection of Explosives, ISSSR 2008, Hoboken, NJ, June, **2008**.
78. M.L. Ramirez, W Ortiz, L.C. Pacheco-Londoño and S.P. Hernández-Rivera, Remote Detection of Hazardous Liquids Concealed in Glass and Plastic Containers, ISSSR 2008, Hoboken, NJ, June, **2008**.

79. William Ortiz-Rivera, L.C. Pacheco-Londoño and S.P. Hernández-Rivera, Standoff Raman Spectroscopy System for Detection of Explosives, Chemical Warfare Agents Simulants and Toxic Industrial Compounds, ISSSR 2008, Hoboken, NJ, June, **2008**.
80. Samuel P. Hernández-Rivera, Leonardo Pacheco-Londoño, Oliva M. Primera-Pedrozo, William Ortiz and Miguel E. Castro, Modeling of Nitro Group in Explosives: Spectroscopic Measurements and Theoretical Calculations, 2007 IEEE Antennas and Propagation International Symposium, Honolulu, HI, June 10-14, **2007**.
81. Samuel P. Hernandez-Rivera, Jackeline I. Jeréz-Rozo, Oliva M. Primera-Pedrozo, Edwin De La Cruz-Montoya, Leonardo C. Pacheco-Londoño, Nanotechnology Based Detection of Explosives, Chemical, Biological and other Threat Agents, 2007 Nanoelectronic Devices for Defense & Security (NANO-DDS) Conference, Crystal City, VA, June 18-21, **2007**.
82. Samuel P. Hernández-Rivera, Edwin de la Cruz-Montoya, Gabriel A. Pérez-Acosta and Jackeline I. Jerez-Rozo, Enhanced Raman Scattering of Nitroexplosives on Colloidal Nanoparticles of Ag/TiO₂, Nanoscience and Nanotechnology for Chemical and Biological Defense Symposium, 236th American Chemical Society National Meeting, Boston, MA, August, **2007**.
83. Samuel P. Hernandez-Rivera, Leonardo C. Pacheco-Londoño, William Ortiz, and Omar Rivera-Betancourt, Enhanced Raman Detection using Spray-On Nanoparticles/Remote Sensed Raman Spectroscopy, Nanoscience and Nanotechnology for Chemical and Biological Defense Symposium, 236th American Chemical Society National Meeting, Boston, MA, August, **2007**.
84. Oliva M Primera-Pedrozo, Yadira M Soto-Feliciano, Jacqueline I Jerez-Rozo, Miguel E Castro and Samuel P Hernandez-Rivera, Gold Nanorods Substrates at Different Aspect Ratios for Sensing Applications, Nanoscience and Nanotechnology for Chemical and Biological Defense Symposium, 236th American Chemical Society National Meeting, Boston, MA, August **2007**.
85. Samuel P. Hernandez-Rivera, Leonardo C. Pacheco-Londoño, William Ortiz, and Omar Rivera-Betancourt, Enhanced Raman Detection using Spray-On Nanoparticles/Remote Sensed Raman Spectroscopy, Nanoscience and Nanotechnology for Chemical and Biological Defense Symposium, 236th American Chemical Society National Meeting, Boston, MA, August, **2007**.
86. Oliva M Primera-Pedrozo, Yadira M Soto-Feliciano, Jacqueline I Jerez-Rozo, Miguel E Castro and Samuel P Hernandez-Rivera, Gold Nanorods Substrates at Different Aspect Ratios for Sensing Applications, Nanoscience and Nanotechnology for Chemical and Biological Defense Symposium, 236th American Chemical Society National Meeting, Boston, MA, August, **2007**.
87. Jackeline I. Jeréz-Rozo, Oliva M. Primera-Pedrozo, Leonardo C Pacheco-Londoño, Ana Maria Chamoun, Marcia R Balaguera-Gelves, Samuel P. Hernandez-Rivera, Enhanced Raman Scattering of TNT based on metal colloids on layers: Preparation, Characterization and Applications, Platform Presentation, 2007 Nanoelectronic Devices for Defense & Security (NANO-DDS) Conference, Crystal City, VA, June 18-21, **2007**.
88. Alvaro J. Peña-Quevedo, Robert B. Cody, Nairmen Mina-Calmide and Samuel P. Hernández-Rivera, "Preparation, Characterization and identification of Tetramethylene Diperoxide Dicarbamide by Mass Spectrometry and Vibrational Microscopy", 31st PR-ACS Senior Technical Meeting, Mayaguez PR, November, 2007.
89. Yadira M. Soto-Feliciano, Oliva M. Primera-Pedrozo, Ana Maria Chamoun, Markelle Gibbs and Samuel P. Hernandez-Rivera, Synthesis of Silver Colloids Using Sodium Citrate for Defense Surface Enhanced Raman Applications: Varying Citrate - Salt - Colloid Concentrations and Excitation Wavelength, 31st PR-ACS Senior Technical Meeting, Mayaguez PR, November, **2007**.
90. Alvaro J. Peña-Quevedo, Robert B. Cody, and Samuel P. Hernández-Rivera, Novel Method Development for Analysis of High Energy Peroxides by Direct Analysis in Real Time Mass Spectrometry, 31st PR-ACS Senior Technical Meeting, Mayaguez PR, November, **2007**.

91. Sandra L. Peña Luengas, Jackeline I. Jeréz, Mady M. Vega Ayala, Victor de la Cruz and Samuel P. Hernández-Rivera, SPME-HPLC Methodology for Detection of Nitroexplosives, 31st PR-ACS Senior Technical Meeting, Mayaguez PR, November, **2007**.
92. Deborah E. Nieves Mercado, William Ortiz-Rivera, Leonardo C. Pacheco Londoño, Michael Ramirez, Orlando Ruiz and Samuel P. Hernandez-Rivera, Detection of Toxic industrial compounds and Chemical Warfare agent simulant in water contained in commercial bottles, 31st PR-ACS Senior Technical Meeting, Mayaguez PR, November, **2007**.
93. Padilla, I.Y., Rate Limiting Fate and Transport of Explosive Chemical from Point Buried Sources, Oral Presentation in 10th Annual Army Landmine Basic Research Technical Review Meeting, January 31-February 1, **2007** in Springfield, Va.
94. Padilla, I. Y., J. P. Gutiérrez, M. d. L. Irizarry, Marín, and S. Hwang, Transport of Explosive Related Chemicals from Point Sources, Poster Presentation in Detection and Remediation Technologies for Mines and Minelike Targets XII, SPIE Defense and Security Symposium, April 9-12, **2007** in Orlando, FL.
95. Molina, G.M., I.Y. Padilla, and M. Pando, Infiltration Experiments Through Unsaturated Sand Using a Field Lysimeter, Poster Presentation in UPRM Sigma Xi VIII Symposium, April 27, **2007**.
96. Padilla, I. Y. and J.P. Gutiérrez, Transport of TNT and DNT in Soil Under Infiltration and Evaporation Events, Poster Presentation in American Geophysical Union 2007 Joint Assembly, Acapulco, Mexico, May, 22-25, **2007**.
97. Padilla, I. Y. and S. Hwang, Development of Physical Models for Fate and Transport Measurements of TNT and DNT Under Variable Environmental Conditions, Oral Presentation in American Geophysical Union 2007 Joint Assembly, Acapulco, Mexico, May 22-25, **2007**.
98. Rosangela Rivera and Nairmen Mina Adsorption of Landmine Chemical Explosives on Soil clay Mineral Surfaces, , Real-Time Explosive Specific Chemical Sensors MURI Review, Mayagüez, PR, March **2007**.
99. Nairmen Mina, Vibrational Spectroscopy and theoretical Modeling of Landmine Chemical Explosives in Soil Environments. Real-Time Explosive Specific Chemical Sensors MURI Review, Mayagüez, PR, March 2007.
100. Rosangela Rivera and Nairmen Mina, Adsorption Coefficients for TNT-Soil and TNT-Clay Interactions, EXPOCHEM 2006, Rafael A. Mangual Coliseum, University of Puerto, November 9-11, **2006**.
101. Samuel P. Hernández-Rivera Miguel E Castro, Jacqueline I. Jeréz-Rozo, Edwin De La Cruz, Leonardo C. Pacheco-Londoño and Oliva M. Primera-Pedrozo, *Surface Enhanced Raman Scattering Detection of Threat Chemicals*, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, **2006**.
102. Samuel P. Hernández-Rivera, *Raman and FTIR of Threat Chemicals: Applications in Defense and Security*, EXPOCHEM 2006, University of Puerto Rico, Mayagüez, PR, November 9-11, **2006**.
103. Vazquez M., Padilla I., Hwang S. "Effect of Surface Vegetation on the Fate, Transport and Detection of Explosives-Related Compounds" XVII Undergraduate Research Symposium 2006, Universidad Metropolitana (UMET), Model Institutions for Excellence (MIE), San Juan, PR. Sep. 15-16, **2006**.
104. Samuel P. Hernández-Rivera, Nairmen Mina and Miguel E. Castro, *Recent Developments in Vibrational Standoff Detection of Explosives*, 10th Annual Landmine Detection Research Review Meeting, Springfield, VA, 31 January- 1 February, **2007**.
105. Samuel P. Hernandez-Rivera, *Recent Developments in Chemical Point/Standoff Detection of Explosives Using Vibrational Spectroscopy*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
106. Leonardo Pacheco-Londoño, Oliva M Primera-Pedrozo, William Ortiz Miguel E. Castro and Samuel P. Hernández-Rivera, *Modeling of Nitro Group in Explosives: Spectroscopic Measurements and Theoretical Calculations*, 2007 IEEE Antennas and Propagation International Symposium, Honolulu, HI, June 10-14, **2007**.

107. Samuel P. Hernandez-Rivera, Jackeline I. Jeréz-Rozo, Oliva M. Primera-Pedrozo, Edwin De La Cruz-Montoya, Leonardo C. Pacheco-Londoño, *Nanotechnology Based Detection of Explosives, Chemical, Biological and other Threat Agents*, 2007 Nanoelectronic Devices for Defense & Security (NANO-DDS) Conference, Crystal City, VA, June 18-21, **2007**.
108. Yadira Soto-Feliciano, Oliva M. Primera-Pedrozo and Samuel P. Hernández-Rivera, Synthesis of Silver Nanorods at Different Aspect Ratio for Surface-Enhanced Raman Scattering (SERS) Applications, National Conference on Undergraduate Research 2007 (NCUR) at Dominican University, San Rafael, CA, April 11-15, **2007**.
109. Jackeline I. Jeréz-Rozo, Oliva M. Primera-Pedrozo, Leonardo C. Pacheco-Londoño, Ana Maria Chamoun, Marcia R. Balaguera-Gelves, Samuel P. Hernandez-Rivera, *Enhanced Raman Scattering of TNT based on metal colloids on layers: Preparation, Characterization and Applications*, Platform Presentation, 2007 Nanoelectronic Devices for Defense & Security (NANO-DDS) Conference, Crystal City, VA, June 18-21, **2007**.
110. Yadira Soto-Feliciano, Oliva M. Primera-Pedrozo, Leonardo C. Pacheco-Londoño and Samuel P. Hernández-Rivera, Synthesis of Gold Nanorods at Different Aspect Ratio for Surface-Enhanced Raman Spectroscopy (SERS) Applications, More Graduate Education at Mountain State Alliance 2007 (MGE@MSA) at Arizona State University, April 21-24, **2007**.
111. Kristina Soto, Tatiana Luna and Samuel P. Hernandez-Rivera, Spectroscopic Characterization of Biological Agents Using Normal Raman and Surface Enhanced Raman Scattering. More Graduate Education at Mountain State Alliance 2007 (MGE@MSA) at Arizona State University, April 21-24, **2007**.
112. Deborah Nieves, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera. *Chemical Warfare Agents Stimulants (CWAS) Detection on different surfaces using Fiber Optic Coupled Grazing Angle Probe-FTIR*, Puerto Rico Interdisciplinary Scientific Meeting (PRISM 2007) and Junior Technical Meeting 2007, Interamerican University of Puerto Rico, Bayamón Campus, PR, March 10, 2007.
113. Nelmarie Rodrieuez, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera 2, 4, 6-trinitrotoluene on Non Traditional Surfaces: Fiber Optic Coupled Grazing Angle Probe- FTIR Detection, Puerto Rico Interdisciplinary Scientific Meeting (PRISM 2007) and Junior Technical Meeting 2007, Interamerican University of Puerto Rico, Bayamón Campus, PR, March 10, **2007**.
114. Oliva M. Primera-Pedrozo, Yadira M. Soto-Feliciano, Evamarie Figueroa-Mass, and Leonardo C. Pacheco-Londoño and Samuel P. Hernández-Rivera. *Gold Nanorods at Different Aspect Ratios for Surface-Enhanced Raman Scattering (SERS) Applications*. Puerto Rico Interdisciplinary Scientific Meeting (PRISM 2007) and Junior Technical Meeting 2007, Interamerican University of Puerto Rico, Bayamón Campus, PR, March 10, **2007**.
115. Kristina Soto, Tatiana Luna and Samuel P. Hernandez-Rivera, Spectroscopic Characterization of Biological Agents Using Normal Raman and Surface Enhanced Raman Scattering. Puerto Rico Interdisciplinary Scientific Meeting (PRISM 2007) and Junior Technical Meeting 2007, Interamerican University of Puerto Rico, Bayamón Campus, PR, March 10, **2007**.
116. Alvaro J. Peña-Quevedo, Mildred M. Ramos-Torrés, José R. González, Luis A. Rivera-Montalvo, Nairmen Mina-Calmide, and Samuel P. Hernández-Rivera, Vibrational Characterization, Identification and Detection of High Energy Organic Peroxides: TATP, DADP, HMTD and TMDD, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
117. Alvaro J. Peña-Quevedo, Robert Cody and Samuel P. Hernández-Rivera, Novel Method Development of Trace Detection High Energy Organic Peroxides by AccuTOF - Direct Analysis in Real Time (DART), SIGMA XI, XII 2007 STUDENTS POSTER DAY, April 26, **2007**.
118. Jose R. Gonzalez, Mildred M. Ramos-Torres Alvaro J. Peña-Quevedo and Samuel P. Hernández-Rivera, Method Development for Trace Detection of Triacetone Triperoxide

- Mixed with Sucrose by Raman Spectrometry, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
119. Alvaro J. Peña-Quevedo , Robert Cody, Nairmen Mina-Camilde and Samuel P. Hernández-Rivera, Detection of High Energy Amine Peroxides by Direct Analysis in Real Time-TOF, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
 120. Bibiana Báez, Vivian Florian, Andrea Cabanzo, Julio Briano, Miguel Castro and Samuel P. Hernández-Rivera, Detection of Chemical Signatures from TNT Buried in Sand at Various Ambient Conditions: Phase II, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
 121. Deborah Nieves, Oliva M. Primera-Pedrozo, Orlando Ruiz, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, Detection of Chemical Warfare Agents Simulants (CWAS) using Fiber Optic Coupled Grazing Angle Probe-FTIR, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
 122. Edwin De La Cruz- Montoya, Tatiana Luna-Pineda, Gabriel Pérez-Acosta and Samuel P. Hernández-Rivera, Nanoparticles of Ag/TiO₂ as Raman Scattering Surfaces for Enhanced Detection of Explosives, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
 123. Evamarie Figueroa-Mas , Yadira Soto –Feliciano, Oliva M. Primera-Pedrozo, , and Samuel P. Hernandez-Rivera, Gold Nanorods at Different Aspect Ratio for Surface-Enhanced Raman Scattering (SERS) Applications, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
 124. Yadira Soto-Feliciano, Evamarie Figueroa-Mas, Oliva M. Primera-Pedrozo and Samuel P. Hernandez-Rivera, Silver Nanorods at Different Aspect Ratios for Surface-Enhanced Raman Scattering (SERS) Applications, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
 125. Gabriel Perez, Edwin De La Cruz, Víctor De La Cruz, Leonardo C. Pacheco and Samuel P. Hernandez-Rivera Photodegradation Kinetics of Explosives Catalyzed by TiO₂ Nanoparticles, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
 126. Gloria Marcela Herrera-Sandoval Luz Marina Ballesteros, Nairmen Mina, Julio Briano and Samuel P. Hernández-Rivera, TNT –Montmorillonite Clay Particles Vibrational Signatures, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
 127. Jackeline I. Jerez-Rozo, Ana Maria Chamoun and Samuel P. Hernández-Rivera, SERS Detection of Nitroexplosives on Nanoparticles Substrates: Ag and Au Colloids and Au-Ag Alloys, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
 128. Leonardo Pacheco-Londoño, Oliva M. Primera-Pedrozo, William Ortiz, Pedro M. Fierro, and Samuel P. Hernández-Rivera, Standoff Detection of Explosives Using a Raman Telescope, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, 2007.
 129. Marcos A. Barreto-Cabán and Samuel P. Hernández-Rivera, Novel Method for the Preparation of Explosives Nanoparticles, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
 130. Michael L. Ramirez, Leonardo Pacheco-Londoño and Samuel P. Hernández-Rivera, Characterization of Peroxide-based Explosives by Thermal Analysis, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
 131. Mildred Ramos, Alvaro J. Peña-Quevedo and Samuel P. Hernández-Rivera, Method Development for Identification and Trace Detection of High Energy Amine Peroxides by GC-MS, FT-NMR and Vibrational Microscopy, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.

132. Nelmarie Rodríguez –Cardona, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, Detection of TNT on Non Traditional Surfaces by Fiber Optic Coupled Grazing Angle Probe – FTIR, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
133. Orlando Ruiz, Oliva M. Primera-Pedrozo, Leonardo C. Pacheco-Londoño, Michael Ramirez and Samuel P. Hernández-Rivera, Comparison of Transfer Techniques for Explosives Detection, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
134. Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño, Yadira Soto -Feliciano and Samuel P. Hernandez-Rivera, Detection of Explosive Mixtures on Surfaces using Grazing Angle Probe – FTIR, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
135. Pedro Fierro, Omar Rivera-Betancourt, Nairmen Mina, Miguel E. Castro and Samuel P. Hernández-Rivera, UV Raman Detection of 2,4-DNT in contact with Sand Particles, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
136. Ricardo Infante-Castillo, and Samuel P. Hernández-Rivera, Experimental and theoretical and vibrational and NMR studies of RDX, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
137. Sandra L. Peña, Edwin de la Cruz, Samuel P. Hernández-Rivera, HPLC – SPME Methodology for Detection of Nitroexplosives, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
138. Sandra N. Correa, Bibiana Baez and Samuel P. Hernández-Rivera, Detection of explosives by SPME/GC in buried TNT soils, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
139. Tatiana Luna-Pineda, Kristina Soto-Feliciano, Edwin De La Cruz-Montoya, Carlos Ríos-Velázquez and Samuel P. Hernández-Rivera, Spectroscopic Characterization of Biological Agents Using Normal Raman and Surface Enhanced Raman Spectroscopy, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
140. William Ortiz, Doris Nunez-Quintero, Leonardo C. Pacheco-Londoño and Samuel Hernández-Rivera, Spectroscopic Modeling of Nitro Group in Explosives, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
141. Yadira Soto–Feliciano, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, Temperature Dependence of Detection Limits of TNT on Metallic Surfaces using Fiber Optic Coupled FTIR, SIGMA XI, XII 2007 STUDENTS POSTER DAY, University of Puerto Rico – Mayagüez, Mayagüez, PR, April 26, **2007**.
142. Alvaro J. Peña-Quevedo, Robert Cody, Nairmen Mina-Camilde and Samuel P. Hernández-Rivera, *Detection of High Energy Amine Peroxides by Direct Analysis in Real Time-TOF*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
143. Bibiana Báez, Vivian Florian, Andrea Cabanzo, Julio Briano, Miguel Castro and Samuel P. Hernández-Rivera, *Detection of Chemical Signatures from TNT Buried in Sand at Various Ambient Conditions: Phase II*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
144. Edwin De La Cruz- Montoya Tatiana Luna-Pineda, Gabriel Pérez-Acosta and Samuel P. Hernández-Rivera, *Nanoparticles of Ag/TiO₂ as Raman Scattering Surfaces for Enhanced Detection of Explosives*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
145. Gabriel Perez, Edwin De La Cruz, Víctor De La Cruz, Leonardo C. Pacheco and Samuel P. Hernandez-Rivera, *Photodegradation Kinetics of Explosives Catalyzed by TiO₂ Nanoparticles*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.

146. Edwin De La Cruz Montoya, Miguel E. Castro and Samuel Hernández Rivera, *Enhanced Raman Spectroscopy of 2,4,6-Trinitrotoluene and 2,4-Dinitrotoluene in Anatase and Rutile Titania Nanocrystals*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
147. Gloria Marcela Herrera-Sandoval, Luz Marina Ballesteros, Nairmen Mina, Julio Briano and Samuel P. Hernández-Rivera, *TNT –Montmorillonite Clay Particles Vibrational Signatures*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
148. Jackeline I. Jerez-Rozo, Ana Maria Chamoun and Samuel P. Hernández-Rivera, *SERS Detection of Nitroexplosives on Nanoparticles Substrates: Ag and Au Colloids and Au-Ag Alloys*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
149. Leonardo Pacheco-Londoño, Oliva M. Primera-Pedrozo, William Ortiz, Pedro M. Fierro, and Samuel P. Hernández-Rivera, *Standoff Detection of Explosives Using a Raman Telescope*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
150. Marcos A. Barreto-Cabán and Samuel P. Hernández-Rivera, *Novel Method for the Preparation of Explosives Nanoparticles*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
151. Michael L. Ramirez, Leonardo Pacheco-Londoño and Samuel P. Hernández-Rivera, *Characterization of Peroxide-based Explosives by Thermal Analysis*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
152. Mildred Ramos, Alvaro J. Peña-Quevedo and Samuel P. Hernández-Rivera, *Method Development for Identification and Trace Detection of High Energy Amine Peroxides by GC-MS, FT-NMR and Vibrational Microscopy*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
153. Nelmarie Rodríguez-Cardona, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernández-Rivera, *Detection of 2, 4, 6-Trinitrotoluene on Non Traditional Surfaces by Fiber Optic Coupled Grazing Angle Probe-FTIR*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
154. Orlando Ruiz Oliva M. Primera-Pedrozo, Leonardo C. Pacheco-Londoño, Michael Ramirez and Samuel P. Hernández-Rivera, *Comparison of Transfer Techniques for Explosives Detection*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
155. Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño, Yadira Soto -Feliciano and Samuel P. Hernández-Rivera, *Detection of Explosive Mixtures on Surfaces using Grazing Angle Probe-FTIR*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
156. Pedro Fierro, Omar Rivera-Betancourt, Nairmen Mina, Miguel E. Castro and Samuel P. Hernández-Rivera, *UV Raman Detection of 2,4-DNT in contact with Sand Particles*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
157. Ricardo Infante-Castillo, and Samuel P. Hernández-Rivera, *Experimental and theoretical and vibrational and NMR studies of RDX*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
158. Sandra L. Peña, Edwin de la Cruz, Samuel P. Hernández-Rivera, *HPLC – SPME Methodology for Detection of Nitroexplosives*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
159. Sandra N. Correa, Bibiana Baez and Samuel P. Hernández-Rivera, *Detection of explosives by SPME/GC in buried TNT soils*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
160. Tatiana Luna-Pineda, Kristina Soto-Feliciano, Edwin De La Cruz-Montoya, Carlos Ríos-Velázquez and Samuel P. Hernández-Rivera, *Spectroscopic Characterization of Biological Agents Using Normal Raman and Surface Enhanced Raman Spectroscopy*,

- MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
161. William Ortiz, Doris Nunez-Quintero, Leonardo C. Pacheco-Londoño and Samuel Hernández-Rivera, *Spectroscopic Modeling of Nitro Group in Explosives*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
 162. Yadira Soto-Feliciano, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, *Temperature Dependence of Detection Limits of TNT on Metallic Surfaces using Fiber Optic Coupled FTIR*, MURI-UPRM Program Annual Review Meeting, Mayagüez Resort and Casino, Mayagüez, PR, March 6-7, **2007**.
 163. Deborah Nieves, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera. *Chemical Warfare Agents Stimulants (CWAS) Detection on different surfaces using Fiber Optic Coupled Grazing Angle Probe-FTIR*, Puerto Rico Interdisciplinary Scientific Meeting (PRISM 2007) and Junior Technical Meeting 2007, Interamerican University of Puerto Rico, Bayamón Campus, PR, March 10, 2007.
 164. Nelmarie Rodriuez, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera 2, 4, 6-trinitrotoluene on Non Traditional Surfaces: Fiber Optic Coupled Grazing Angle Probe- FTIR Detection, Puerto Rico Interdisciplinary Scientific Meeting (PRISM 2007) and Junior Technical Meeting 2007, Interamerican University of Puerto Rico, Bayamón Campus, PR, March 10, **2007**.
 165. Oliva M. Primera-Pedrozo, Yadira M. Soto-Feliciano, Evamari Figueroa-Mass, and Leonardo C. Pacheco-Londoño and Samuel P. Hernández-Rivera. *Gold Nanorods at Different Aspect Ratios for Surface-Enhanced Raman Scattering (SERS) Applications*. Puerto Rico Interdisciplinary Scientific Meeting (PRISM 2007) and Junior Technical Meeting 2007, Interamerican University of Puerto Rico, Bayamón Campus, PR, March 10, **2007**.
 166. Kristina Soto, Tatiana Luna and Samuel P. Hernandez-Rivera, *Spectroscopic Characterization of Biological Agents Using Normal Raman and Surface Enhanced Raman Scattering*. Puerto Rico Interdisciplinary Scientific Meeting (PRISM 2007) and Junior Technical Meeting 2007, Interamerican University of Puerto Rico, Bayamón Campus, PR, March 10, **2007**.
 167. Alvaro J. Peña-Quevedo , Robert B. Cody, Nairmen Mina-Calmide, and Samuel P. Hernández-Rivera, *Synthesis, Characterization and Identification of Tetramethylene Diperoxide Dicarbamide by Direct Analysis Real Time –Mass Spectrometry and Vibrational Microscopy*, 233rd American Chemical Society Meeting, Chicago, IL, March 25-29, **2007**.
 168. Kristina Soto-Feliciano, Tatiana Luna-Pineda, Edwin De La Cruz-Montoya, Carlos Ríos-Velázquez and Samuel P. Hernández-Rivera, “Spectroscopic Characterization o Biological Agents Using Normal Raman and Surface Enhanced Raman Spectroscopies”, 3rd Latin American and Caribbean Biotechnology Congress, Mayagüez, PR, September 22, **2006**.
 169. Bibiana Báez, Vivian Florián, Samuel P. Hernández-Rivera, Andrea Cabanzo, Sandra Correa, Maik Irrazábal, Julio G. Briano, Miguel E. Castro, “Detection of chemical signatures from TNT buried in sand at various ambient conditions” American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, **2006**.
 170. Deborah Nieves, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, “Detection of Chemical Warfare Agents Simulants (CWAS) using Fiber Optic Coupled Grazing Angle Probe-FTIR”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, **2006**.
 171. Alvaro J. Peña-Quevedo , Robert B. Cody, Nelmarie Rodríguez, Deborah Nieves, Miguel Castro-Rosario, Nairmen Mina-Camide, and Samuel P. Hernández-Rivera, “Synthesis, Characterization and Differentiation of High Energy Amine Peroxides by DART-TOF-MS and Vibrational Microscopy”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, **2006**.
 172. Gabriel Perez, Edwin De La Cruz, Victor De La Cruz, Leonardo C. Pacheco and Samuel P. Hernández-Rivera, “Structural properties and Photodegradation Kinetic relationships of

- explosives with TiO₂ nanoparticles”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, **2006**.
173. Gloria Marcela Herrera-Sandoval , Luz Marina Ballesteros, Nairmen Mina, Julio Briano, and Samuel P. Hernández-Rivera, “Vibrational Signatures of TNT-Montmorillonite Clay Particles”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, **2006**.
 174. Maik Irrazábal, Vivian Florián, Samuel P. Hernández-Rivera, and Julio G. Briano, “Fate and Transport of ERCs in Soil from Landmine Emissions, Numerical Simulations”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, **2006**.
 175. Jackeline I. Jeréz-Rozo, Ana Maria Chamoun, Joany Hernández and Samuel P. Hernández-Rivera, “Enhanced Raman scattering of nitro-explosives on nanoparticle substrates: Ag and Au colloids and Au-Ag alloy”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, 2006.
 176. Leonardo Pacheco-Londoño, Oliva M. Primera-Pedrozo and Samuel P. Hernández-Rivera, “Standoff Infrared Detection of Explosives at Laboratory Scale”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, **2006**.
 177. Nelmarie Rodríguez –Cardona, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, “Detection of 2, 4, 6-Trinitrotoluene on Surfaces using Fiber Optic Coupled Grazing Angle Probe- FTIR, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, **2006**.
 178. Ricardo Infante-Castillo and Samuel P. Hernández-Rivera, “Theoretical and experimental vibrational and NMR studies of RDX”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, **2006**.
 179. Sandra Peña Edwin de la Cruz, Samuel P. Hernández-Rivera, “Development of SPME – HPLC Methodology for Detection of Nitroexplosives”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, **2006**.
 180. Tatiana Luna-Pineda, Kristina Soto-Feliciano, Edwin De La Cruz-Montoya, Carlos Ríos-Velázquez and Samuel P. Hernández-Rivera, “Spectroscopic Characterization of Biological Agents Using Normal Raman and Surface Enhanced Raman Spectroscopy”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, **2006**.
 181. Yadira Soto-Feliciano, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, “Temperature Dependence of the Limits of Detection of TNT on Metallic Surfaces using Fiber Optic Coupled-FTIR”, American Chemical Society, Puerto Rico Section, 30th Senior Technical Meeting, November 3-4, **2006**.
 182. Alvaro J. Peña-Quevedo, Robert B. Cody, Nelmarie Rodríguez, Deborah Nieves, Miguel Castro-Rosario, Nairmen Mina-Camide and Samuel P. Hernández-Rivera, “Characterization and Differentiation of High Energy Amine Peroxides by DART-TOF-MS and Vibrational Microscopy”, EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, **2006**.
 183. Bibiana Báez, Vivian Florián, Samuel P. Hernández-Rivera, Andrea Cabanzo, Sandra Correa, Maik Irrazabal, Julio G. Briano, Miguel E. Castro, Detection of chemical signatures from TNT buried in sand at various ambient conditions”, EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, **2006**.
 184. Deborah Nieves, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, “Detection of Chemical Warfare Agents Simulants (CWAS) using Fiber Optic Coupled Grazing Angle Probe-FTIR”, EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, **2006**.
 185. Gabriel Perez, Edwin De La Cruz, Victor De La Cruz, Leonardo C. Pacheco and Samuel P. Hernández-Rivera, “Photodegradation Kinetics of explosives with TiO₂ nanoparticles”, EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, **2006**.

186. Gloria Marcela Herrera-Sandoval, Luz Marina Ballesteros, Nairmen Mina, Julio Briano and Samuel P. Hernández-Rivera, "FTIR and Raman Signatures of TNT –Montmorillonite Clay Particles", EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, **2006**.
187. Jackeline I. Jeréz-Rozo, Ana Maria Chamoun, Joany Hernández and Samuel P. Hernández-Rivera, "Detection of nitro-explosives by Enhanced Raman scattering on nanoparticle substrates: Ag and Au colloids and Au-Ag alloy", EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, **2006**.
188. Leonardo Pacheco-Londoño, Oliva M. Primera-Pedrozo and Samuel P. Hernández-Rivera, "Detection of Explosives by Standoff Infrared at Laboratory Scale", EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, **2006**.
189. Nelmarie Rodríguez –Cardona, Oliva M. Primera-Pedrozo, Leonardo Pacheco-Londoño and Samuel P. Hernandez-Rivera, "Fiber Optic Coupled Grazing Angle Probe- FTIR Detection of 2, 4, 6-Trinitrotoluene on Surfaces", EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, **2006**.
190. Ricardo Infante-Castillo and Samuel P. Hernández-Rivera, Theoretical and experimental vibrational and NMR studies of RDX, EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, 2006.
191. Sandra Peña, Edwin de la Cruz, Samuel P. Hernández-Rivera, "Development of SPME – HPLC Methodology for Detection of Nitroexplosives", EXPOCHEM 2006, University of Puerto Rico Mayagüez, Mayagüez, PR, November 91-11, **2006**.
192. Tatiana Luna-Pineda, Kristina Soto-Feliciano, Edwin De La Cruz-Montoya, Carlos Ríos-Velázquez and Samuel P. Hernández-Rivera, "Normal Raman and Surface Enhanced Raman Spectroscopy Detection of Biological Agents", EXPOCHEM 2006, University of Puerto Rico, Mayagüez, PR, November 9-11, **2006**.
193. *Vibrational Spectroscopy of Explosives: From the Research Lab to Field Experiments*, Samuel P. Hernández-Rivera, 9th Annual Army Landmine Basic Research Technical Review Meeting, Sponsored by the Army Research Office and the Joint Unexploded Ordnance Coordination Office, Springfield, Virginia, February **2006**.
194. Samuel P. Hernández-Rivera, *MURI Center For Chemical Sensors Development: Program Overview*, Real-Time Explosive Specific Chemical Sensors MURI Review Big Sky, Montana, February 2006.
195. Samuel P. Hernández-Rivera, *Vibrational Spectroscopy of Explosives*, Real-Time Explosive Specific Chemical Sensors MURI Review Big Sky, Montana, February 2006.
196. Julio Briano, *Review of Numerical Simulation of Fate and Transport of ERCs in Soil from Landmine Emissions*, Real-Time Explosive Specific Chemical Sensors MURI Review Big Sky, Montana, February **2006**.
197. Julio Briano, *Finite Volume Elements Calculation of Transport of Explosives in Soils*, Real-Time Explosive Specific Chemical Sensors MURI Review Big Sky, Montana, February 2006.
198. Julio Briano, *Fate and Transport of TNT from Landmines, a Numerical Approach*, 9th Annual Army Landmine Basic Research Technical Review Meeting, Sponsored by the Army Research Office and the Joint Unexploded Ordnance Coordination Office, Springfield, Virginia, February **2006**.
199. Yadira Soto-Feliciano, *Fiber Optic Coupled – Reflection Absorption Infrared Spectroscopy: Development of Sensitive and Robust Quantitative Analysis Methodology of Traces of Organic Residues on Surfaces*, Proceedings of The National Conference on Undergraduate Research (NCUR) 2006, The University of North Carolina at Asheville, Asheville, North Carolina, April 6 – 8, **2006**.
200. Alia El Burai-Félix, *SER(R)S of Gold and Silver Metal Colloidal Film Deposited on a Flexible Polymer Substrate*, 26th Puerto Rico Interdisciplinary Scientific Meeting, 41st Junior Technical Meeting, Cayey, PR, March, **2006**.
201. Yadira Soto-Feliciano, *TNT and PETN on surfaces: Grazing Angle – FTIR*, 26th Puerto Rico Interdisciplinary Scientific Meeting, 41st Junior Technical Meeting, Cayey, PR, March, **2006**.

202. Samuel P. Hernández-Rivera, *Vibrational Spectroscopy of Chemical Agents and Toxic Vapors: From the Research Lab to Field Experiments*, 2006 International Symposium on Spectral Science Research, Bar Harbor ME, June, **2006**.
203. Samuel P. Hernández-Rivera, *Center For Chemical Sensors Development*, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.
204. Samuel P. Hernández-Rivera, *Vibrational Spectroscopy Applied to IED Defeat: From The Research Lab to Field Experiments*, UXO/Countermine/Range, Forum 2006, Las Vegas, Nevada, July, **2006**.
205. Rosángela Rivera, Liliana Alzate, Neisa M. Hernandez, Samuel P. Hernandez, and Nairmen Mina, Adsorption of TNT on clay minerals, 231st ACS National Meeting & Exposition, Atlanta GA, March 26-30, **2006**.
206. Neisa M. Hernandez, Rosángela Rivera, Liliana Alzate, Yleana Colon, Samuel P. Hernandez, and Nairmen Mina Molecular orbital calculations of the RDX-siloxane surface complex, 231st ACS National Meeting & Exposition, Atlanta GA, March 26-30, **2006**.
207. Leonardo C. Pacheco, *Vibrational spectroscopy study of triacetone triperoxide: Experimental and DFT Theoretical Studies*, XXXI Congreso de Químicos Teóricos de Expresión Latina ("Congress of Theoretical Chemist of Latin Expression"), QUITEL2005, Margarita Island, Venezuela, October 2-6, **2005**.
208. Oliva M Primera, *Stability and Verification of TATP Fragment Cations in Gas Phase: Mass Spectrometry and DFT Theoretical Studies*, XXXI Congreso de Químicos Teóricos de Expresión Latina ("Congress of Theoretical Chemist of Latin Expression"), QUITEL2005, Margarita Island, Venezuela, October 2-6, **2005**.
209. Yadira Soto, *TNT and PETN on surfaces: Grazing Angle – FTIR*, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November **2005**.
210. Álvaro J. Peña, *Analytical Methodology for Identification and Trace Analysis of Cyclic Acetone Peroxide Compounds by GC-MS*, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November **2005**.
211. Neisa M. Hernández, Liliana Alzate, Rosangela Rivera, Samuel P. Hernández and Nairmen Mina. Interactions and vibrational spectroscopic signature of TNT in soil. XXIX ACS Senior Technical Meeting, Lajas P.R., November **2005**.
212. Padilla, Ingrid, Diego Perez, and Juan Pablo Gutierrez, Two-Dimensional Modeling Of The Fate And Transport Of Explosive Chemicals Near Soil-Atmospheric Interfaces Subjected to Advection Processes, Poster presentation in Geological Society of America Annual Conference, Salt Lake City, Utah, October 16-19, **2005**.
213. Perez, Diego, David Hernandez, and I. Padilla, Physical Modeling of the Fate and Transport of Explosive Chemicals in 1-D Soil Columns Subjected to Advection Processes, Poster Presentation in 25th Puerto Rico Interdisciplinary Scientific Meeting and 40th ACS Junior Technical Meeting, March 12, **2005**.
214. Torres, Alexander and I. Padilla, Physical Modeling of Explosive Chemicals Diffusion in Soils Under Variable Environmental Conditions, Poster Presentation in 25th Puerto Rico Interdisciplinary Scientific Meeting and 40th ACS Junior Technical Meeting, March 12, **2005**.
215. Tarafa, P. A. Torres, V. Vargas, and I. Padilla, Transport of Landmine-Derived Chemicals in Different Soils Under Variable Environmental Conditions, Poster Presentation in 25th Puerto Rico Interdisciplinary Scientific Meeting and 40th ACS Junior Technical Meeting, March 12, **2005**.
216. Carmen M. Ramos, Neisa M. Hernandez, Rosángela Rivera, Liliana Alzate, Yleana Colon, Samuel P. Hernandez, and Nairmen Mina Density Functional Theory Treatment of the Structures and Vibrational Frequencies of 2,4- and 2,6-dinitrotoluenes. XXXI Congreso de Químicos Teóricos de Expresión Latina (QUITEL2005) Venezuela, Octubre 2-6, **2005**.
217. Michael L. Ramírez, *Characterization of Energetic Compounds Using Differential Scanning Calorimetry*, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November **2005**.

218. Oliva M. Primera, *TNT and PETN on surfaces: Grazing Angle – FTIR*, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November **2005**.
219. Álvaro J. Peña, *Method Development for Trace Detection and Differentiation of High Energy Cyclic Peroxide by Vibrational Microscopy*, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November **2005**.
220. Bibiana Báez, *Detection of Explosives in Soils using SPME with Gas Chromatography and TEEM –Mass Spectrometry*, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November **2005**.
221. Edwin de la Cruz, *Surface Enhanced Raman Spectroscopy of 2,4,6-Trinitrotoluene in Anatase Nanocrystal*, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November **2005**.
222. Indira Jerez-Rozo, *Raman Scattering of Nitroexplosives on Nanoscaled Substrates: Tungsten Trioxide, Copper (I) Oxide, Molybdenum (VI) Oxide, Tin (IV) Oxide, Cobalt (II, III) Oxide, Cerium (IV) Oxide And Scandium Oxide*, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November **2005**.
223. Leonardo C. Pacheco, *Nitroexplosives Classification by Molecular Descriptors*, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.
224. Luz M. Ballesteros, *Raman Spectroscopic Signatures of PETN in Soil*, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November **2005**.
225. Gloria M. Herrera, *Vibrational Raman Signatures of TNT in Contact with Sand Particles*, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.
226. Marcia del R. Balaguera, *SERS(S) of Metal Colloidal Polymeric Film*, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November 2005.
227. Michael L. Ramírez, *Thermal Ink Jet Based Sample Transfer Techniques for Explosives Detection*, XXIX American Chemical Society Senior Technical Meeting, Lajas P.R., November **2005**.
228. Hernandez-Rivera, S.P., "Spectroscopic Signature of Landmine Components in Soil and its Equilibrium Vapor: The First Step Towards Real-Time Landmine Sensing", 7th Annual Army Landmine Basic Research Technical Review Meeting, Alexandria, VA, February 24-25, **2004**.
229. Hernández-Rivera, S.P., "Detection of Explosives via Spectroscopic Signatures", Workshop for Improvised Explosive Device (IED) Locating Through Explosives Detection, Night Vision and Electronic Sensors Directorate, Institute for Defense Analysis, Alexandria, VA, July 1, **2004**.

2. DEMOGRAPHIC DATA FOR THE REPORTING PERIOD: DISSEMINATION

- a. Number of manuscripts – **146**
- b. Number of Peer Reviewed Papers – **27**
- c. Number of Non-Peer Reviewed Papers – **119**
- d. Number of Presented but not Published Papers – **229**

3. DEMOGRAPHIC DATA FOR THE LIFE OF THIS AGREEMENT:

- a. Number of Scientists Supported by the Project – **8**
- b. Number of Inventions as a result of the Project – **2**
- c. Number of PhD awarded as a result of the Project – **7**
- d. Number of BS awarded as a result of the Project – **30**
- e. Number of Patents Submitted as a result of the Project – **2**
- f. Number of Patents Awarded as a result of the Project – **0**
- g. Number of Graduate Students Supported by the Project – **70**
- h. Number of FTE Graduate Students Supported by the Project – **30**
- i. Number of Post Doctorate Students supported by the Project – **2**

- j. Number of FTE Post Doctorate Students supported by the Project – **0**
- k. Number of Faculty supported by the Project – **8**
- l. Number of Other Staff supported by the Project – **4**
- m. Number of Undergraduate Students supported by the Project – **61**
- n. Number of MS awarded as a result of the Project – **25**

1. STUDENT METRICS FOR GRADUATING UNDERGRADUATES FUNDED BY THIS AGREEMENT

- a. Number of undergraduates funded by your agreement during this reporting period-**61**
- b. Number of undergraduates funded by your agreement, who graduated during this reporting period-**61**
- c. Number of undergraduates funded by your agreement, who graduated during this reporting period with a degree in science, mathematics, engineering, or technology field-**58**
- d. Number of undergraduates funded by your agreement, who graduated during this reporting period and will continue to pursue a graduate or Ph.D. degree in science, mathematics, engineering, or technology field- **45**
- e. Number of undergraduates funded by your agreement, who graduated during this reporting period and intend to work for the Department of Defense- **5**
- f. Number of undergraduates graduating during this period, who achieve at least a 3.5 GPA based on a scale with a maximum of a 4.0 GPA- **27**
- g. Number of undergraduates working on your agreement, who graduated during this period and were funded by a DoD Center of Excellence for Education, Research or Engineering - **0**
- h. Number of undergraduates funded by your agreement, who graduated during this period and will receive a scholarship or fellowship for further studies in a science, mathematics, engineering, or technology field-**5**

5. REPORT OF INVENTIONS” NONE

2. SCIENTIFIC PROGRESS AND ACCOMPLISHMENTS:
Included as part of Executive Summary

7. TECHNOLOGY TRANSFER: NONE

II. PROJECT SUMMARY AND PROJECT BUDGET EXPENDITURES AND FORECAST

This project involved a team of scientist, engineers and students at all levels from undergraduate students to post doctoral trainees. It consists of a truly multidisciplinary effort directed to tackle the problem of laying the grounds to design and built real-time, point detection sensors to detect explosive chemicals present in landmines. The project infrastructure consists of four fully interacting components. These groups often merge in joint purposes to achieve common goals and achieving the maximum possible interaction between students, investigators and support personnel. Expertise in areas of chemical detection combine with theoretical computations, numerical and physical environmental modeling to provide a complete research package working together to achieve the program goal: to provide background information on chemical signatures of landmine explosives so that real-time, point detected sensors for detection of landmine explosives may be designed and built at commercial scale.

The total granted money for 2002-10: \$5,444,700

