



Nanomaterials and Technologies for Naval Applications

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Nanotechnology Partnership Forum
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Summary

- Wide range of defense applications for nanomaterials
- Established mechanisms for collaboration
 - SBIR / STTR (ONR, NAVSEA, others)
 - Mantech
 - Other ONR-sponsored mechanisms
 - NSRP
 - Relevant conferences

Connecting

➤ SBIR / STTR

- <http://www.navysbir.com/>
- <http://www.acq.osd.mil/osbp/sbir/>
- <https://www.fbo.gov/>

➤ Navy Manufacturing Technology (Mantech)

• Centers of Excellence

<http://www.onr.navy.mil/Science-Technology/Directorates/Transition/Manufacturing-ManTech.aspx>

- Benchmarking and Best Practices Center of Excellence (B2PCOE)
- Center for Naval Shipbuilding Technology (CNST)
- Composites Manufacturing Technology Centers (CMTC)
- Electro-Optics Center (EOC)
- Electronics Manufacturing Productivity Facility (EMPF)
- Energetics Manufacturing Technology Center (EMTC)
- Institute for Manufacturing and Sustainment Technologies (iMAST)
- Navy Joining Center (NJC)
- Navy Metalworking Center (NMC)
- <https://www.dodmantech.com/>

Connecting

- ONR: <http://www.onr.navy.mil/>
 - Office of Innovation
 - Office of Research
 - Office of Transition
- National Shipbuilding Research Program
<http://www.nsrp.org/>
- Opportunities at conferences
 - Naval S&T Partnership Conference
 - SBIR <http://www.acq.osd.mil/osbp/sbir/conferences/>
 - Defense Manufacturing Conference
 - Mantech Center of Excellence Conferences
 - SHIPTECH (Navy Metalworking Center)

Connecting

Naval S&T Partnership Conference

- Pitch-A-Principal: meet with an ONR subject matter expert about your idea. Submissions through Sept. 30.

<http://www.onr.navy.mil/Conference-Event-ONR/science-technology-partnership/pitch-principal.aspx>

- Industry can sign-up to give an Independent Research & Development brief to government:

<http://www.onr.navy.mil/Conference-Event-ONR/science-technology-partnership/Independent-Research-Development.aspx>

- CNR Challenge: submit a white paper at the conference to compete for \$1 million in research funds:

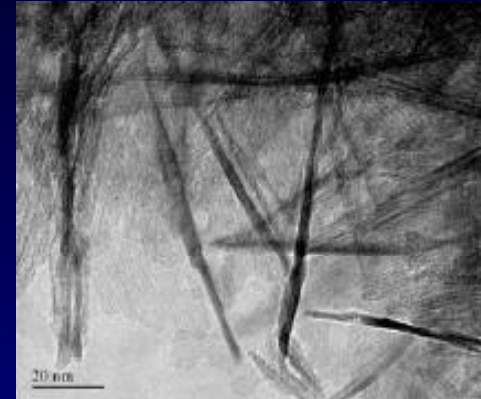
<http://www.onr.navy.mil/Conference-Event-ONR/science-technology-partnership/2010-CNR-Challenge.aspx>

Nanomaterials for Defense

- Filtration and Biocides
- Composite material reinforcement
- Multifunctional coatings
- Energy and electromechanical systems
- Optical systems
- Nanoelectronics (nanocircuits, sensors)

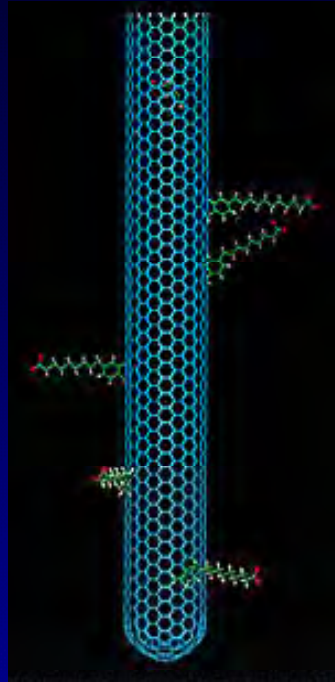
Filtration and Biocides

- NanoCeram[®] alumina filter and Seldon filters
 - Air Force sponsored
 - Water purification
 - Bacteria and viruses
 - Arsenic
 - High efficiency
 - High throughput



Composite Material Enhancement

Functionalized
carbon nanotubes



Foster-Miller

MER Corp.

NanoLab

NanoRidge Materials

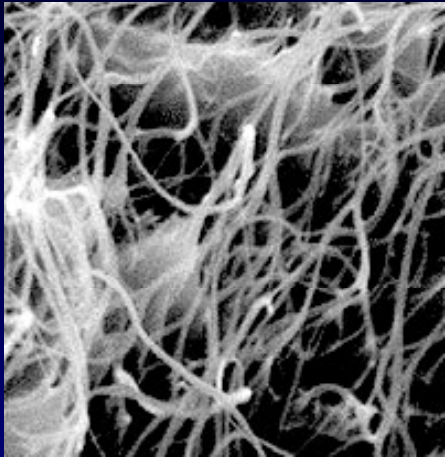
Systran Federal Corp.

Carbon Solutions

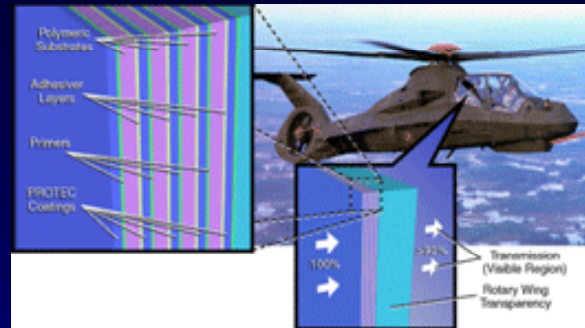
Triton Systems

- Increased stiffness
- Controlled permittivity for radomes
- Erosion and cavitation resistance for fan blades

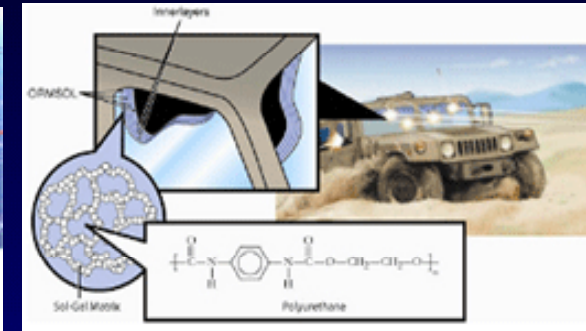
Multifunctional materials, coatings



ONR: SWNT for conductive gap sealants in aircraft

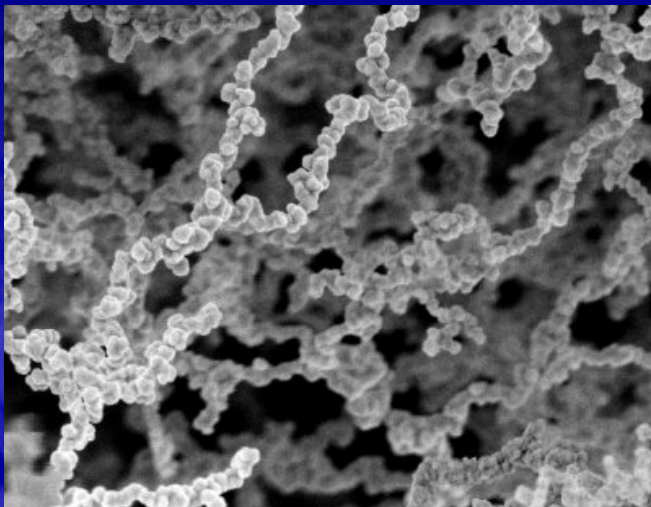


Nanoparticles in glass coatings for anti-fogging, abrasion resistance



Nanocomposite polymer in ballistic windows

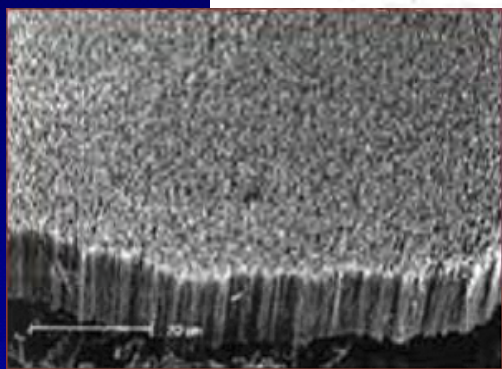
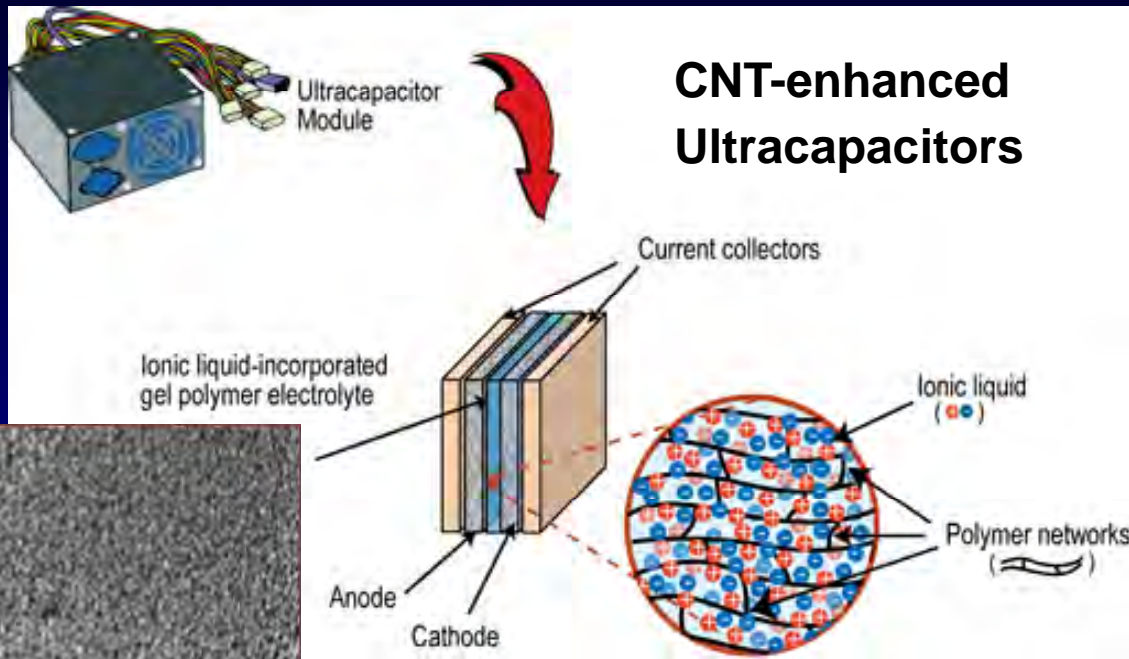
AFRL: Nickel nanostrands for conductive resins, paints, adhesives; EMI shielding



NAVSEA: Super hydrophobic surfaces, damage sensing and self-repairing



Energy and Electromechanical



ONR: Nanocrystalline cores in power converters

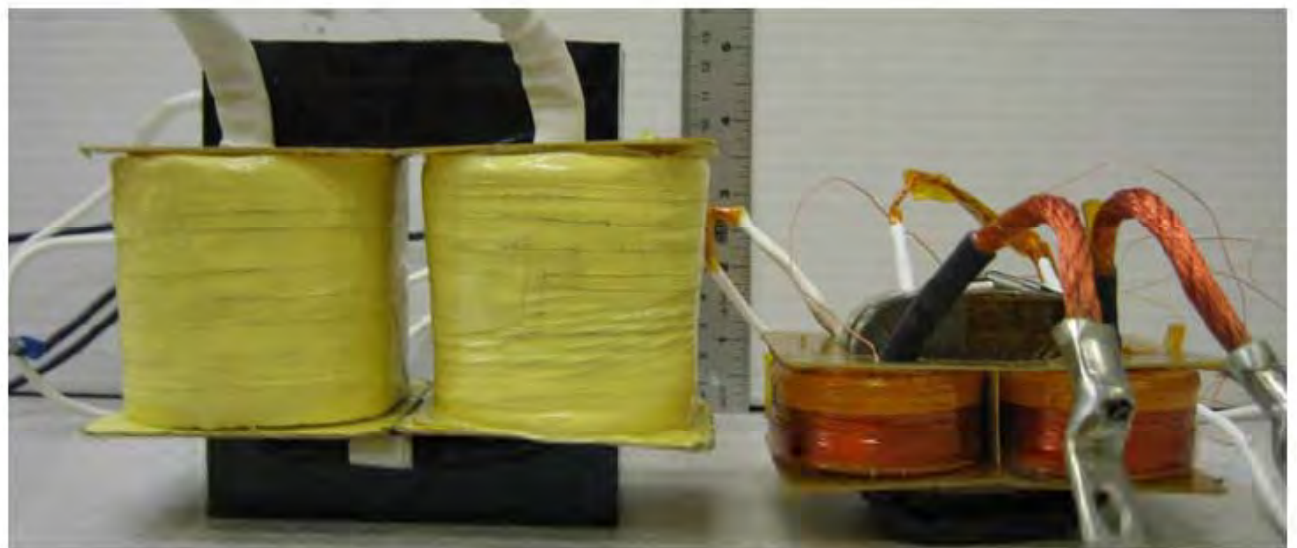
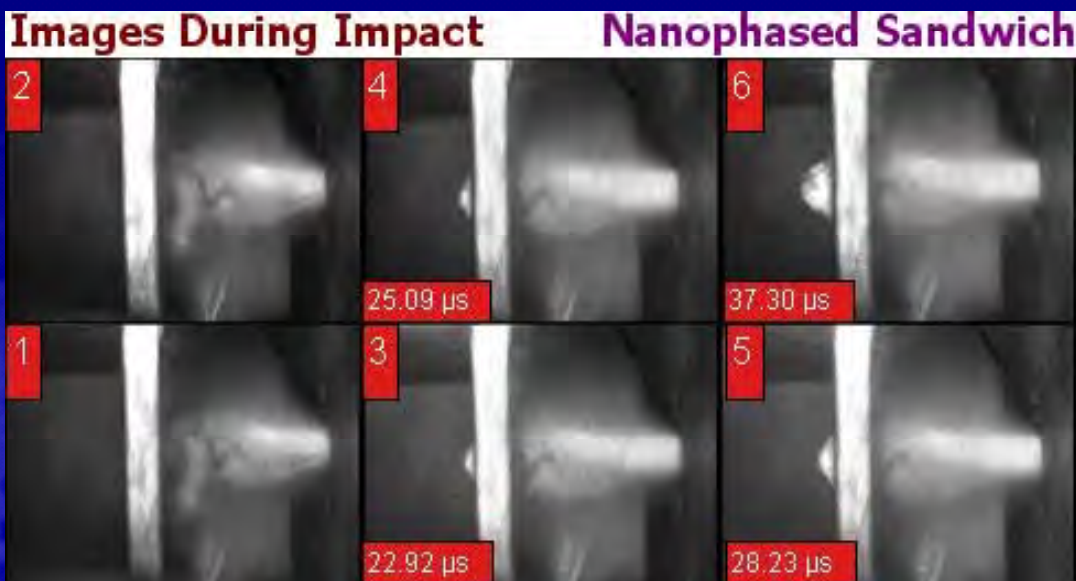
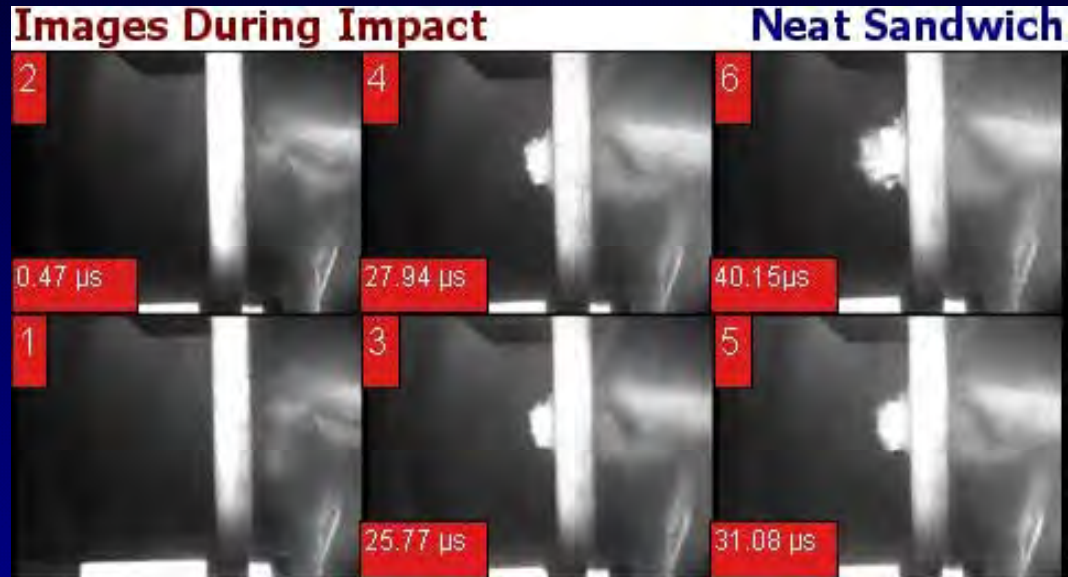


Fig. 5-15 30 kW ferrite core (left) and FT-3M nanocrystalline core (right) transformer prototypes

Body Armor

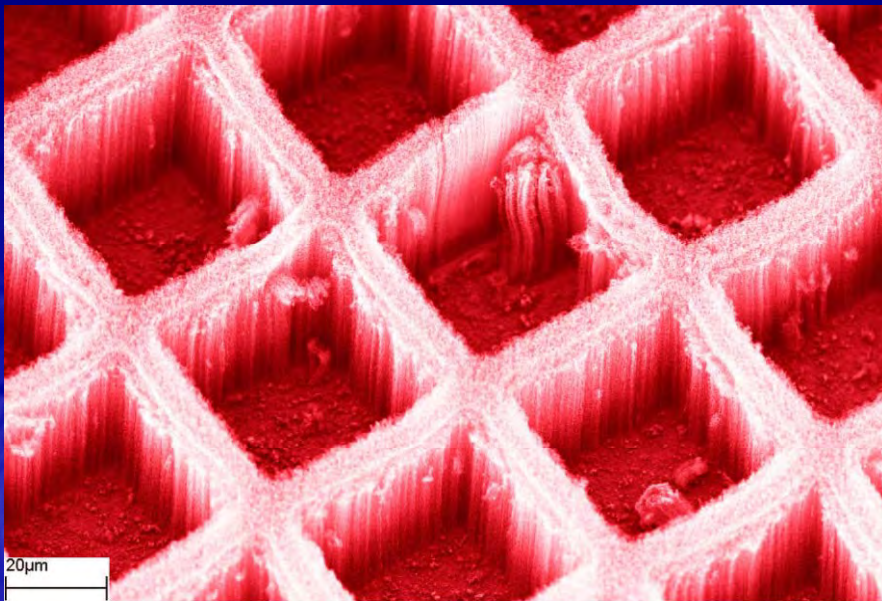
Nanoparticle and nanotube reinforcement



Photovoltaics



Flexible solar cells, printing technology, increased efficiencies with nanoparticles



**Nanotubes on silicon
increase surface area**



Nanoelectronics

OSD10-T004

Nanomanufactured catalytic arrays on
patterned addressable substrates for
advanced electronic device applications

<http://www.dodsbir.net/Topics/Default.asp>

Deadline: 15 Sept 2010

Goal: uniform growth of high quality multiwalled CNTs
perpendicular to substrate
low base contact resistance

Summary

- Wide range of defense applications for nanomaterials
- No “Nano-Central”
- Traditional mechanisms for collaboration
 - SBIR / STTR program managers: Get to know them
 - Mantech
 - Other ONR-sponsored mechanisms
 - Conferences of interest
 - NSRP: Connect with shipbuilders

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Questions?

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<http://www.navsea.navy.mil/nswc/carderock/>