

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE October 1996	3. REPORT TYPE AND DATES COVERED Final, 1 May 96 - 31 Oct 96		
4. TITLE AND SUBTITLE Layered Materials for Structural Applications			5. FUNDING NUMBERS F49620-96-1-0179	
6. AUTHOR(S) John J. Lewandowski			AFOSR-TR 97 0054	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Materials Research Society 9800 McKnight Road, Suite 327 Pittsburgh, PA 15237				
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) Air Force Office of Scientific Research AFOSR/NA 110 Duncan Ave, Suite B115 Bolling AFB DC 20332-8080			10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release, distribution is unlimited.			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) Layered materials and systems based on metallic, intermetallic, polymeric and ceramic constituents are becoming increasingly important to meet the structural requirements of current and future high-performance products. This award was used to support a symposium entitled "Layered Materials for Structural Applications," sponsored by the Materials Research Society. The symposium drew 41 invited and contributed papers. The symposium was divided into four emphasis areas: Applications, Processing, Stability Issues, and Mechanical Behavior. A symposium proceedings was published and is available through the Materials Research Society as Symposium Proceedings, Volume 434.				
14. SUBJECT TERMS Layered, laminate, composite			15. NUMBER OF PAGES 8	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT UNLIMITED	

MATERIALS RESEARCH SOCIETY
SYMPOSIUM PROCEEDINGS VOLUME 434

Layered Materials for Structural Applications

Symposium held April 8-11, 1996, San Francisco, California, U.S.A.

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TABLE OF CONTENTS

Preface	ix
Materials Research Society Symposium Proceedings	x

PART I: APPLICATIONS

*Advanced Aircraft Engine Microlaminated Intermetallic Composite Turbine Technology	3
<i>R.G. Rowe, D.W. Skelly, M.R. Jackson, M. Larsen, and D. LaChapelle</i>	
*Mechanics of Metal Matrix Laminates	15
<i>J.L. Teply</i>	
Microstructure and Thermal Conductivity of Thermal Barrier Coatings Processed by Plasma Spray and Physical Vapor Deposition Techniques	27
<i>K.S. Ravichandran, R.E. Dutton, S.L. Semiatin, and K. An</i>	
Multi-Phase Functionally Graded Materials for Thermal Barrier Systems	33
<i>M.R. Jackson, A.M. Ritter, M.F. Gigliotti, A.C. Kaya, and J.P. Gallo</i>	
Examination of In-Service Coating Degradation in Gas Turbine Blades Using a Small Punch Testing Method	39
<i>J. Kameda, T.E. Bloomer, C.R. Gold, Y. Sugita, M. Ito, and S. Sakurai</i>	

PART II: PROCESSING

*Reactive Sputter Deposition of Superhard Polycrystalline Nanolayered Coatings	47
<i>William D. Sproul</i>	
Tribological Properties of Ti/TiN Nanomultilayers	57
<i>Ph. Houdy, P. Psyllaki, S. Labdi, K. Suenaga, and M. Jeandin</i>	
Structural and Phase Transformations in Thin Film Ti-Aluminides and Ti/Al Multilayers	63
<i>R. Banerjee, S. Swaminathan, R. Wheeler, and H.L. Fraser</i>	
The Structural Investigation of Alumina and Aluminum Nitride Mixed Thin Films Prepared by D.C. Plasma Processes Under Different Conditions	69
<i>Paul W. Wang and Shixian Sui</i>	

*Invited Paper

Low Temperature Synthesis of Mo₂C/W₂C Superlattices via Ultra-Thin Modulated Reactants	75
<i>Christopher D. Johnson and David C. Johnson</i>	

*FGMs by Sedimentation	81
<i>Y. He, V. Subramanian, and J. Lannutti</i>	

Pressureless Co-Sintering of Al₂O₃/ZrO₂ Multilayers and Bilayers	93
<i>Peter Z. Cal, David J. Green, and Gary L. Messing</i>	

PART III: STABILITY ISSUES

*Mechanical Properties of Metal-Intermetallic Microlaminate Composites	101
<i>J. Heathcote, G.R. Odette, G.E. Lucas, and R.G. Rowe</i>	

Structural Stability of Si-O-α-C:H/Si-α-C:H Layered Systems	113
<i>U. Müller and R. Hauert</i>	

Mechanical and Thermal Stability of Heavily Drawn Pearlitic Steel Wire	119
<i>Etienne Aernoudt, Javier Gil Sevillano, Hilde Delruc, Jan Van Humbeeck, Piet Watté, and Ignace Lefever</i>	

Interfacial Diffusion Effects and Non-Stability of Disperse Layered Structures	127
<i>L.N. Paritskaya and V.V. Bogdanov</i>	

PART IV: MECHANICAL BEHAVIOR

*Yield Stress of Nano- and Micro- Multilayers	135
<i>P.M. Hazzledine and S.I. Rao</i>	

Micromechanics of Deformation and Fracture in Low Symmetry Layered Materials	141
<i>Bimal K. Kad, Ming Dao, and Robert J. Asaro</i>	

Coherency Strain and High Strength at High Temperature	147
<i>M.E. Brenchley, D.J. Dunstan, P. Kidd, and A. Kelly</i>	

Synthesis and Mechanical Properties of Niobium Films by Ion Beam Assisted Deposition	153
<i>H. Ji, G.S. Was, and J.W. Jones</i>	

*Orowan-Based Deformation Model for Layered Metallic Materials	159
<i>Eric R. Kreidler and Peter M. Anderson</i>	

*Invited Paper

An Analysis of Ductile Brittle Fracture Transition in Layered Composites	171
<i>S.B. Biner</i>	
Residual Stress Distribution in an Al₂O₃-Ni Joint Bonded with a Composite Layer	177
<i>X.-L. Wang, B.H. Rabin, R.L. Williamson, H.A. Bruck, and T.R. Watkins</i>	
A Finite Element Study on Constrained Deformation in an Intermetallic/Metallic Microlaminate Composite	183
<i>J. Heathcote, G.R. Odette, and G.E. Lucas</i>	
Synthesis of Carbon Nitride Composite Thin Films Prepared by Pulsed Laser Deposition Method	189
<i>Ashok Kumar, R.B. Inturi, U. Ekanayake, H.L. Chan, Q. You, G. Wattuhewa, and J.A. Barnard</i>	
*Design and Properties of Multilayered Ceramic Composites	195
<i>D.B. Marshall</i>	
*Toughening Mechanisms in Al/Al-SiC Laminated Metal Composites	205
<i>D.R. Lesuer, J. Wadsworth, R.A. Riddle, C.K. Syn, J.J. Lewandowski, and W.H. Hunt, Jr.</i>	
Effects of Ductile Phase Additions on the Fracture Behavior and Toughness of DRA Composites	213
<i>L. Yost Ellis, J.J. Lewandowski, and W.H. Hunt, Jr.</i>	
Impact Behavior of Extrinsicly Toughened Discontinuously Reinforced Aluminum Composites	219
<i>M.A. Irfan, N. Liou, and V. Prakash</i>	
*Fracture of Laminated and <i>In Situ</i> Niobium Silicide-Niobium Composites	227
<i>J.D. Rigney</i>	
Toughness and Subcritical Crack Growth in Nb/Nb₃Al Layered Materials	243
<i>D.R. Bloyer, K.T. Venkateswara Rao, and R.O. Ritchie</i>	
The Fracture Behavior of SiCp/Aluminum Alloy Composites with and without Large Al-Particles	249
<i>A.B. Pandey, B.S. Majumdar, and D.B. Miracle</i>	
Fabrication, Structure and Properties of Aluminum-Aluminide Layered Composites	255
<i>D.E. Alman</i>	

*Invited Paper

Time Dependent Stress Fields Ahead of the Interface Cracks in Creep Regime	261
<i>S.B. Biner</i>	
Mechanical Behavior and Constitutive Modeling During High Temperature Deformation of Al Laminated Metal Composites	267
<i>R.B. Grishaber, R.S. Mishra, and A.K. Mukherjee</i>	
Mechanical Behavior of a Ni/TiC Microlaminate Under Static and Fatigue Loading	275
<i>Y.C. Her, P.C. Wang, J.-M. Yang, and R.F. Bunshah</i>	
Fatigue Crack Growth in Aluminum Laminate Composites	281
<i>P.B. Hoffman, R.D. Carpenter, and J.C. Gibeling</i>	
Fatigue Behavior of SCS-6/Titanium/Titanium Aluminide Hybrid Laminated Composite	287
<i>P.C. Wang, Y.C. Her, and J.-M. Yang</i>	
Evaluation of Impact Damage Resistance in Laminated Composites Using Resins with Different Crosslink Densities	293
<i>A.J. Lesser</i>	
Inherently Smart Laminates of Carbon Fibers in a Polymer Matrix.	299
<i>Xiaojun Wang and D.D.L. Chung</i>	
Brick Structure Improved by Using Cement Mortar Containing Short Carbon Fibers	305
<i>Mingquang Zhu and D.D.L. Chung</i>	
Author Index	311
Subject Index	313

PREFACE

Layered materials and systems based on metallic, intermetallic, polymeric and ceramic constituents are becoming increasingly important to meet the structural requirements of current and future high-performance products. In response to various research and development activities in these areas, Symposium U was organized to cover a range of topics dealing with layered materials for structural applications and was supported by contributions from The Air Force Office of Scientific Research and Office of Naval Research. The support of these organizations is gratefully acknowledged. This proceedings volume is based on the first MRS symposium dedicated to current research and development of layered materials which are being considered for a range of structural applications.

The meeting began with overviews on structural applications of layered systems and highlighted applications such as thermal barrier coatings, aircraft structural components, and wear-resistant coatings for a variety of applications. Processing techniques such as EB deposition processing, reactive sputter deposition, sedimentation processing, pressureless co-sintering, and rapid prototyping via laminated object manufacturing were subsequently covered in a following session. Microstructural stability issues were additionally covered and highlighted as a critical area requiring further investigation. The largest number of papers presented focused on the mechanical behavior and modeling of layered systems and revealed significant effects of layer thickness, spacing, and constituent properties on the fracture and fatigue behavior of such systems. While considerable work has investigated the issues of strength and toughness, less effort has been focused on the behavior of such systems under either cyclic loading or high-temperature conditions.

The symposium was well attended and attracted attendees from the academic community as well as from various industrial and government laboratories. The organizers would like to express their appreciation for the contributions of the session chairs and the individuals who served as reviewers for the manuscripts. In addition, the able editorial assistance of Jacqueline Blackburn at the Alcoa Technical Center is gratefully acknowledged. All of their efforts were vital to the successful conduct of the symposium and the rapid publication of these proceedings.

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June, 1996