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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.

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Layered Materials for Structural Applications

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*Invited Paper

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