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TMS 2017
146th Annual Meeting & Exhibition

February 26 – March 2, 2017
San Diego, California, USA

MULTISCALE ARCHITECTURED MATERIALS (MAM II): TAILORING MECHANICAL INCOMPATIBILITY FOR SUPERIOR PROPERTIES

This second international symposium will focus on the fundamental science and technology of multiscale architectured materials (MAM), which include gradient materials, heterogeneous materials, laminate materials, etc. MAM is characterized with large mechanical incompatibility among heterogeneous structural and/or compositional domains. The length scale of the heterogeneity could be in some cases comparable to the dimensions of the component. The large mechanical incompatibility leads to much higher non-uniform deformation than what is normally observed in conventional materials. This unique deformation behavior is reported to produce a superior combination of high strength and ductility that is not accessible to either nanostructured or coarse-grained homogeneous materials.

MAMs represent an emerging area that is expected to become a major research field for the communities of materials, mechanics, and physics in the next few years. The MAM strategy is not only capable of producing structural materials with unprecedented mechanical properties, but also efficient for developing multifunctional materials. Innovative top-down or bottom-up approaches and material architectures, some of which may be bio-inspired, need to be explored and developed to produce MAMs with superior or disruptive properties. There are many fundamental issues that need to be studied by experiments, analytical modeling, and computer modeling. Particularly, interface engineering and interface-related phenomena such as strain/strain gradient buildup and their effect on the global properties are critical issues.

This symposium, and the future biannual symposia that follow, will act as a forum to bring multidisciplinary researchers together to exchange ideas, discuss key issues, and promote industrial technology development for commercial production and applications.

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