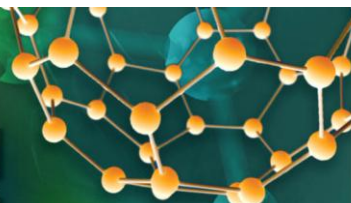




2009 MRS
spring meeting
San Francisco, CA • April 13-17



Abstract Deadline: November 3, 2008

www.mrs.org/spring2009

REMINDER:
In fairness to all potential authors,
late abstracts will not be accepted.

CALL FOR PAPERS

MRS Symposium KK: Structure-Property Relationships in Biomineralized and Biomimetic Composites

There is a growing need for the development of new structural materials with high strength and durability, light weight, low cost, and complete recyclability. Nature has evolved efficient strategies, exemplified in the mineralized tissues of numerous species, to synthesize low-weight structural materials that exhibit exceptional strength and durability. In these biomineralized systems, minerals and proteins exist in close proximity and at nanoscale dimensions. Interactions at these interfaces are vital to the functions of structural materials in nature, such as mollusk shells, teeth, and bone. Although the organic constituents of these biological composite materials are often present in relatively small quantities, they not only control the nucleation and growth of mineral, but also significantly alter the mechanical behavior of the bulk structures. While the existence of the organic phase tends to dissipate significant quantities of energy during loading, the close proximity of the mineral phase also tends to significantly increase the mechanical properties, such as elastic modulus and hardness of the organics, and make them appreciably more resistant to abrasion and wear.

This symposium will explore the structure-mechanical property relationships in biomineralized and biomimetic composites. The study and mimicry of biomineralized systems plays a key role in developing new materials and structures. Pragmatic outcomes of this research in the areas of biomedical, automotive, aerospace, and structural engineering will be presented.

Topics will include (but not be limited to):

- Modeling and simulation of mechanical properties in biomineralized and mimetic systems
- Structure-function properties of biomineralized tissues
- Experimental design, synthesis and properties of biomimetic composites
- Biomaterials for tissue engineering
- Investigation of biomineralized tissue ultrastructure (inorganic and organic)
- Quantifying the ultrastructural response of the organic and inorganic phases in biological composites to mechanical stresses, using high resolution *in-situ* synchrotron and spectroscopic techniques
- Visualizing the 2D and 3D deformation and fracture mechanisms in hierarchically structured biological and biomimetic materials at the nano- and microscale, using electron microscopy, micro-tomography and other methods

Joint sessions with Symposia LL: *Architected Multifunctional Materials*, and MM: *Synthesis of Bio-Inspired Hierarchical Soft and Hybrid Materials*, are being considered.

Invited speakers include:

Joanna Aizenberg (Harvard Univ.), **Ilhan Aksay** (Princeton Univ.), **Steve Badylak** (McGowan Inst. of Regenerative Medicine-Pittsburgh), **Asa Barber** (Queen Mary College, Univ. of London, United Kingdom), **William Barvosa-Carter** (HRL Laboratories, LLC), **Melinda Duer** (Univ. of Cambridge, United Kingdom), **Steve Eichhorn** (Univ. of Manchester, United Kingdom), **Steve Eppell** (Case Western Reserve Univ.), **John Evans** (New York Univ.), **Peter Fratzl** (Max-Planck-Inst.-Potsdam, Germany), **Pupa Gilbert** (Univ. of Wisconsin-Madison), **Philip Jones** (IMERYS), **George Mayer** (Univ. of Washington), **Phillip Messersmith** (Northwestern Univ.), **John Z. Pietrzyk** (Biomimetic Connections, LLC), **Nico Sommerdijk** (Eindhoven Univ. of Technology, The Netherlands), **Yoshiro Takano** (Tokyo Medical and Dental Univ. Grad. School, Japan), **Herb Waite** (Univ. of California-Santa Barbara), **Julin Wan** (GE Global Research), **Steve Weiner** (Weizmann Inst. of Science, Israel), and **Paul Zaslansky** (Max-Planck-Inst., Germany).

Symposium Organizers

David Kisailus

University of California-Riverside, Dept. of Chemical and Environmental Engineering, 357 Bourns Hall, Riverside, CA 92521
Tel 951-827-2260, Fax 951-827-5696, david@engr.ucr.edu

Lara Estroff

Cornell University, Dept. of Materials Science and Engineering, 329 Bard Hall, Ithaca, NY 14853
Tel 607-254-5256, lae37@cornell.edu

William Landis

Northeastern Ohio Universities College of Medicine, Biochemistry and Molecular Pathology Dept./Orthopaedic Surgery, P.O. Box 95, Rootstown, OH 44272
Tel 330-325-6685, Fax 330-325-5925, wjl@neoucom.edu

Pablo Zavattieri

GM Research & Development Center, MC 480-106-256, 30500 Mound Rd., Warren, MI 48090-9055
Tel 586-864-9055, pablo.zavattieri@gm.com

Himadri S. Gupta

Queen Mary, University of London, School of Engineering and Materials Science, Rm. 220 Engineering Bldg., Mile End Rd., London E1 4NS, United Kingdom
Tel 44-20-7882-8867, Fax 44-20-7882-3390, h.gupta@qmul.ac.uk