Mechanical Engineering

Fall 2008 Seminars

Wednesday, October 8, 2008

1:00pm – 2:30pm

ROOM: 224 MEC

Nanorods Processing: Synthesis and Mechanics

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Nanoscience and nanotechnology pose a challenge to the traditional academic boundaries. The small dimension of nanometers requires an understanding of materials behavior at the atomic and electronic levels. On the other hand, realization of nanotechnology depends on engineering integration involving product design, thermal management, and mechanics, for example. This presentation shows one case study that crosses the boundaries of fundamental surface science, nanosynthesis, and nanomechanics.

Using a combination of atomistic simulations and experiments, the speaker and his associates have identified a new diffusion mechanism and a new characteristic length scale on crystalline surfaces. Integration of these two pieces of fundamental surface science with existing knowledge (stacking fault and geometrical shadowing) leads to the design of self-organized nanosynthesis. Under mechanical loading, these nanorods can be elastic stiffer and softer, and they can be plastically stronger or weaker. Our atomistic simulations have revealed novel mechanisms of stiffening/strengthening.

Hanchen Huang is a Professor of Mechanical Engineering and Nuclear Engineering at Rensselaer Polytechnic Institute. In professional societies, Hanchen is the co-chair of Nanotechnology Committee of USACM, the chair of Young Investigator Award Committee of ICCES, and a guest editor of MRS Bulletin. He has an interdisciplinary background: BS education in physics, MS education in theoretical physics, PhD education in nuclear engineering, post-doc training in materials and mechanics, teaching in mechanical and nuclear engineering, and current research on interface processing. Since 1995 when Hanchen received his PhD degree from UCLA, he has worked at Lawrence Livermore National Lab, and taught at Hong Kong Polytechnic University and Rensselaer Polytechnic Institute. His research effort – funded by NSF, DoE, ARL, Hong Kong RGC, national labs, and industry consortia – has led to about 100 refereed journal publications and 1000 SCI citations.

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