Abstract for Invited Keynote Talk
Symposium on "Impact of Scattering on Nanoscience and Nanotechnology"
Annual Meeting of the American Crystallographic Association
May 25-30, 2002, San Antonio, Texas

A Materials Perspective on Nanoscale Science and Technology

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Abstract

Challenges in carrying out nanoscience research and the crucial role of materials synthesis will be discussed briefly. Significant opportunities in materials research for nanoscience and technology then will be described, drawing upon examples from candidate research focus areas of the *Center for Nanophase Materials Sciences* (CNMS), a multidisciplinary Department of Energy nanoscale science research center (NSRC) that is being developed, in collaboration with the scientific community, at Oak Ridge National Laboratory. Particular emphasis will be given to research opportunities that can be addressed through the synergies between neutron science, synthesis science, and theory, modeling, and simulation that the CNMS will develop and exploit. Common themes that link nanoscience research into soft and hybrid materials, chemically complex hard materials, and the modeling of nanoscale phenomena will be noted, including carbon-based nanostructures, block copolymers, and cooperative phenomena in complex oxides.

*Research sponsored by the U.S. Department of Energy under contract DE-AC05-00OR22725 with the Oak Ridge National Laboratory, managed by UT-Battelle, LLC.