

ASM Oak Ridge Chapter Educational Symposium Neutrons for Materials Science and Engineering

April 18, 2007

Spallation Neutron Source, Oak Ridge National Laboratory, Oak Ridge, TN

Synopsis

Meeting the educational needs of students, faculty, engineers and scientists in universities, industry and laboratories and aiding American economic competitiveness are important to the ORNL neutron scattering community at the Spallation Neutron Source and the High Flux Isotope Reactor. These ORNL user facilities, and the state-of-the-art user facilities at other national laboratories funded by the U.S. Department of Energy, are shared with the science community worldwide and offer some technologies and instrumentation that are available nowhere else. Each year, these facilities are used by thousands of researchers from universities, other government agencies, and private industry. The new capabilities at HFIR and SNS will greatly expand the impact of neutron scattering.

Neutron scattering is an important scientific technique to characterize materials of all classes – polymers, soft materials, metals and alloys, and ceramics for such applications as fuel cells, hydrogen storage, biomedical and bio compatible, aerospace, nuclear power, and electronics. Many of the new facilities provide sample environments that provide for measurement at non ambient conditions of temperature or pressure, under applied tensile/compressive/torsion load or in high magnetic fields.

The program of the [ASM Educational Symposium on Neutrons for Materials Science and Engineering](#) has been developed to expand the awareness of North American students and faculty involved in materials science and engineering studies to the diverse applications of neutron scattering and to the expanding facilities in North America. The Symposium is also open to scientists and engineers who wish to obtain a broad overview of the many applications of neutron scattering to studies of materials.

The symposium will include ten talks beginning with the basics of production of neutrons and their uses, an overview of neutron scattering and diffraction methods. Subsequent presentations will present how neutrons are used to study phase transformations, engineering stresses, materials deformation behavior, polymer and soft materials, biomedical and bio related materials, studies of fuel cell and hydrogen storage materials, and a engineering and industrial applications of neutron scattering. Tours of the recently commissioned Spallation Neutron Source and the upgraded High Flux Isotope Reactor sources and associated neutron scattering instruments will culminate the Symposium.

A companion event to the ASM Education Symposium is the [Neutron Stress, Texture and Phase Transformation for Industry Workshop](#) that will begin with an overview session providing an international perspective of the contributions of neutron facilities currently utilizing engineering diffraction techniques for industrial related studies. The poster session at lunch time will provide an opportunity to learn more the research carried out at these neutron facilities in the U.S. and overseas as well as to continue discussions about specific needs of industry attendees. Presentations by speakers affiliated with industry will follow; these will describe relevant ongoing research currently that is assisted by the information made available by neutron scattering.