

Postdoctoral Research Associate in Nanomaterials Research

**Nuclear Science and Technology Division
Energy and Engineering Sciences Directorate
Oak Ridge National Laboratory
Oak Ridge, Tennessee**

ORNLO9-84-NSTD

Project Description:

The Separations & Materials Research Group of the Nuclear Science and Technology Division at Oak Ridge National Laboratory (ORNL) is seeking post-doctoral associates to participate in nanomanufacturing projects on nanomaterials for energy applications, focusing on:

- chemical synthesis of quantum dots, materials and property characterization, and engineering process development for scale-up production of quantum dot nanocrystals for solid-state lighting and solar energy applications,
- molecular self-assembly templated nanoporous/mesoporous nanomaterials and inorganic nanomembranes for in-situ energy conversion/production,
- synthesis and characterization of homogeneous and heterogeneous nanocatalysts for conversion of biomass to biofuels, and
- synthesis and processing of co-continuous interpenetrating ceramic-metal nanocomposites for thermal, mechanical, and functional materials applications.

Up to four positions may be available. One position will involve assembly of experimental systems and development/optimization of synthesis procedures for chemical synthesis of quantum dots of various compositions suitable for solid-state lighting and solar cell development. This position will also involve the chemical engineering process scale-up for production of quantum dot nanocrystals. Another position will involve chemical synthesis of nanostructured films or membranes (e.g., consisting nanoporous/mesoporous channel or nanowire arrays via anodization or molecular assembly-templated synthesis) for in-situ energy conversion/production such as via photoelectrochemical splitting of water to produce hydrogen or photocatalytic conversion of CO₂ into fuels. Another position will focus on the identification, synthesis and evaluation of homogeneous or nanoparticle nanocatalysts for biomass (e.g., lignin) conversion to biofuels.

All candidates will conduct and/or work collaboratively on materials characterization or property measurements of experimental nanomaterials samples by instruments such as microscopy including high-resolution transmission electron microscopy (TEM) and scanning electron microscopy (SEM), product/intermediate identification by microprobe Energy Dispersive X-ray (EDX), X-ray Diffraction (XRD), dynamic light scattering (DLS), X-ray Photoelectron Spectroscopy (XPS), UV/Vis spectroscopy, photoluminescence emission spectroscopy, or Gas Chromatography-Mass Spectrometry (GC-MS). This work will be

complemented by collaborations and interactions with others in the Group, the Laboratory, and the world who are working actively in the relevant functional nanomaterials area.

In addition to the core research assignment, the candidate will also collaborate with others as a team member in helping the same or other projects and in the conduct of other incidental duties associated with the nanotechnology research team. This Team conducts chemical, molecular, and nanomaterials engineering research, analysis and development on processes, systems, and equipment for chemical synthesis of variety of functional nanomaterials tailored for energy applications. The objective of this research is to apply the fundamentals of chemistry and chemical/molecular engineering to the synthesis and processing of inorganic nanomaterials and inorganic-organic or metal-ceramic nanocomposites. A key characteristic of the Team is the unique combination of engineering design and analysis with hands-on chemical and nanomaterials processing research on a laboratory scale, and engineering scale-up nanomanufacturing demonstrations.

Qualifications:

Candidates must have a PhD in Chemistry, Chemical Engineering, or a closely related field such as nanomaterials sciences and engineering. Knowledge of chemical synthesis, thermodynamics and chemical reactions kinetics, and hands-on nanomaterials characterization and processing experience are necessary. Each position requires a strong experimentalist with demonstrated laboratory experience and publications with relevant nanomaterials. The candidate should be a highly motivated self-starter, able to work independently and creatively, and also able to communicate with the supervisor effectively in refining research directions. Internal reports, publication of scientific results in either peer-reviewed journals, or presentations at national meetings, are expected. The candidate must have good oral and written communication skills, and be able to work legally in the States.

Applicants cannot have received the most recent degree more than five years prior to the date of application and must complete all degree requirements before starting their appointment.

Technical Questions:

Further information about these positions can be obtained by contacting Dr. Michael Z. Hu (hum1@ornl.gov), Oak Ridge National Laboratory, Nuclear Sciences and Technology Division, Bldg 4500N, Room A34, MS-6181, Oak Ridge, TN 37831-6181. (Please reference the position title and number when corresponding about this position.)

How to Apply:

Qualified applicants must apply online at https://www2.ornl.gov/ORNL_POST/. All applicants will need to register before they can begin the online application. For complete instructions, on how to apply, please see the instructions at <http://www.ornl.gov/orise/edu/ornl/ornl-pdpm/application.htm>. When applying for this position, please reference the position title and number.

The postdoctoral position will be offered through the Oak Ridge Institute for Science and Education (ORISE) Oak Ridge National Laboratory Postgraduate Research Associates program <http://www.ornl.gov/orise.edu.ornl.ornl-pd/ornlpdoc.htm>. These positions is

open to all qualified candidates without regard to race, color, age, religion, sex, national origin, physical or mental disability, or status as a Vietnam-era veteran or disabled veteran.