PREP Research Associate

This position is part of the National Institute of Standards (NIST) Professional Research Experience (PREP) program. NIST recognizes that its research staff may wish to collaborate with researchers at academic institutions on specific projects of mutual interest, thus requires that such institutions must be the recipient of a PREP award. The PREP program requires staff from a wide range of backgrounds to work on scientific research in many areas. Employees in this position will perform technical work that underpins the scientific research of the collaboration.

Research Title: Post-Doctoral Research Associate: Advanced Calibration Methods for Critical Minerals and Materials

(U.S. Citizens Only)

Overview:

The Material Measurement Laboratory (MML), part of the National Institute of Standards and Technology (NIST), is seeking a Post-Doctoral Researcher to support critical minerals chemical composition research. Candidates must be US citizens and will report to the NIST Charleston, SC laboratory, which is co-located with the USDOC NOAA Hollings Marine Laboratory. The candidate will develop both solid and solution sampling calibration methods using inductively coupled plasma mass spectrometry (ICP-MS), laser ablation (LA) and other techniques characterize the elemental composition of complex material streams such as battery black mass and electronic scrap. These streams contain critical minerals and materials that have economic value, but recovery pathways remain nascent. The driver for this research focuses on validating calibration methods that could potentially port to industry and bolster measurement capabilities across domestic critical materials supply chains.

Key responsibilities will include but are not limited to:

- Method Development: Develop LA and solution-based ICP-MS calibration methods for quantification of critical and toxic metals in complex industrial materials and feedstocks.
- Sample Preparation: Prepare sample pellets for LA calibration and analysis; perform microwave-assisted acid digestions of complex secondary materials (e.g., black mass, e-scrap) and associated reference materials
- Experimental Design, Instrumental Analysis and Data Collection: Design sound experiments; Optimize and run ICP-MS instrumentation and couplings; interpret complex datasets; develop and apply high accuracy calibration schemes.
- Communication: Prepare findings for peer-reviewed publications, technical reports, and oral presentations. Deliverables to include internal Reports of Analysis
- Safety and Compliance: Maintain strict adherence to institutional safety requirements, including hazardous chemical handling protocols; protect intellectual property of candidate research materials

Required Skills, Expertise, and Qualifications:

- PhD in Chemistry, Chemical Engineering, Materials Science, or a related field.
- Proven experience with acid digestions, and trace element quantification is required; fundamental knowledge about plasma source mass spectrometry and LA-ICP-MS is desirable (> 3yrs).

- Excellent written/oral communication; track record of meeting milestones in multidisciplinary teams; demonstrated first author publications.
- Must be comfortable working with caustic and corrosive chemicals and working in a laboratory that maintains strict clean sample preparation protocols ensuring low blanks and cross contamination.
- Familiarity with metal extraction and preservation chemistry, Li battery chemistry, rare earth and toxic metals analyses.

Privacy Act Statement

Authority: 15 U.S.C. § 278g-1(e)(1) and (e)(3) and 15 U.S.C. § 272(b) and (c)

Purpose: The National Institute for Standards and Technology (NIST) hosts the Professional Research Experience Program (PREP) which is designed to provide valuable laboratory experience and financial assistance to undergraduates, post-bachelor's degree holders, graduate students, master's degree holders, postdocs, and faculty.

PREP is a 5-year cooperative agreement between NIST laboratories and participating PREP Universities to establish a collaborative research relationship between NIST and U.S. institutions of higher education in the following disciplines including (but may not be limited to) biochemistry, biological sciences, chemistry, computer science, engineering, electronics, materials science, mathematics, nanoscale science, neutron science, physical science, physics, and statistics. This collection of information is needed to facilitate administrative functions of the PREP Program.

Routine Uses: NIST will use the information collected to perform the requisite reviews of the applications to determine eligibility, and to meet programmatic requirements.
Disclosure of this information is also subject to all the published routine uses as identified in the Privacy Act System of Records Notices: NIST-1: NIST Associates.

Disclosure: Furnishing this information is voluntary. When you submit the form, you are indicating your voluntary consent for NIST to use of the information you submit for the purpose stated.