

**Post for 60 days**

**Title:** Partnership Opportunity: Organic Materials Science and Engineering

**NAICS Code:** 54171-Research and Development in the Physical, Engineering & Life Sciences

**Classification Code:** A-Research and Development

The Organic Materials Science Department at Sandia National Laboratories (Sandia) seeks parties interested in the collaborative research and development of new organic materials. The department develops advanced materials and processing strategies to meet a wide range of specialized industry applications. The department specializes in synthetic organic chemistry, polymer chemistry, thermal/mechanical characterization of organic materials, organometallic chemistry and polymer carbon-based devices. In addition, the department performs materials reliability studies for organics with an emphasis on understanding degradation mechanisms. Current areas of R&D in the department include: tuning of dielectric and electrical properties of new polymers and thin films, reversible and degradable chemistries, carbon MEMS, metal-organic frameworks, shape memory materials, nanoparticle surface modification, polymer interfacial properties and adhesion, polymer degradation, radiation effects on polymers, elastomers, filled polymers, encapsulants and coatings, sensors, and extrusion. In support of these activities we perform a complete spectrum of chemical, structural, thermal, rheological, and mechanical characterizations.

The Materials Science and Engineering Center at Sandia National Laboratories provides expertise in the areas of materials structure, properties, and performance. Specific areas of expertise include:

**Scientifically Engineered Materials:**

The organization develops new and novel materials with defined properties and/or performance characteristics to replace obsolete or unavailable technologies, meet new system requirements, or provide new functional capabilities. Sandia is increasingly interested in understanding and manipulating materials structure, synthesis, and properties at the nanoscale to create materials with enhanced or unique properties.

**Materials Processing:**

Sandia's world class technical team conducts research needed to understand, characterize, model, and ultimately control materials fabrication technologies that are critical to component development and production. New processing technologies, especially at the nano-and micro-scale,

are being developed to support future needs. Sandia aims to combine fundamental knowledge and validated models to enable greater responsiveness and predictability.

**Materials Aging and Reliability:**

Sandia explores the chemical and physical mechanisms that cause materials properties to change, primarily to develop mechanistic-based predictive models of materials reliability. Current areas of interest include both the intrinsic thermodynamic drivers associated with materials and the extrinsic kinetic drivers associated with the environments in which the materials are used. Sandia seeks to develop and apply state-of-the-art materials characterization capabilities to detect early, subtle changes in microstructure and properties.

Sandia has the following capabilities and areas of expertise available to support collaborative work with an industry partner:

- Electronic and Optical Materials
- Thin Films and Coatings
- Nanostructured Materials
- Ceramic Synthesis and Processing
- Catalysis and Reaction Processes
- Data Acquisition and Instrument Control
- Surface Cleaning and Processing
- Corrosion
- Materials Reliability Analysis
- Polymer Performance and Aging
- Polymer Synthesis, Processing and Characterization
- Process Diagnostics and Control
- Spray Coating
- Welding and Brazing
- Metals Characterization
- Failure Analysis

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**Keywords:** Organic, organometallic, research, development, polymer, synthesis, chemistry, synthetic, degradation, reliability, rheology, fabrication