

## **Materials Science & Technology Division FACT SHEET**

### **Mission:**

The MST division mission is to conduct basic and applied research and development on materials in order to improve the understanding of physical phenomena and to develop advanced materials and processes to enable energy-efficient, cost-competitive and environmentally acceptable materials technologies for a variety of important national priorities.

### **Who we are:**

MST Division is centered in the Physical Sciences Directorate at Oak Ridge National Laboratory.

- Consists of 22 R&D Groups, three Programs, and three User Centers
- Research activities consist of a foundation of modeling and simulation, the three classical pillars of materials science: synthesis, structural characterization, and property evaluation, and a variety of applied materials science and technology topics ranging from materials to extreme environments to use-inspired applications
- Materials research is a major contributor to the development of energy technologies
- Leader in open-source materials research
- World class capabilities for materials synthesis, characterization, and property evaluation

### **Research:**

Research activities consists of twenty-five groups can be grouped into six technical themes.

- Theory and modeling at multiple scales,
- designed synthesis of condensed matter physics systems, alloys, structural ceramics, and specialized crystals,
- structural characterization via electron, ion, photon and neutron sciences,
- comprehensive physical and mechanical property characterization,
- interaction with extreme environments (temperature, corrosive media, radiation), and
- applied materials physics (superconductivity, thermoelectrics, hydrogen storage, photovoltaics, catalysis, energy storage)



Extensive research experience in corrosion and degradation of properties of materials in high-temperature, aggressive environments, including gases, molten salts, and liquid metals, in the mechanical, physical, and chemical behaviors of protective oxide layers that form under such conditions, and in materials development of high-temperature alloys, ceramics, and ceramic composites for applications in fossil energy systems, gas turbines, fusion reactors, and energy-intensive industries

Currently, Deputy Director of ORNL's Materials Sciences and Technology Division, whose approximately 300 members conduct or support materials R&D ranging from very fundamental to the engineering/application level. Also serves as manager of the Fossil Energy Materials program. Presently, directly contributes to research projects on Ni-based alloys for use in supercritical steam, prediction of oxide spallation from steels exposed to high-temperature steam, and oxidation of SiC.

### ***Point of Contact:***

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