NATIONAL ENERGY TECHNOLOGY LABORATORY
ALBANY, OREGON

NETL

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Situated on 42 acres, NETL's Albany, Oregon, complex has specialized facilities for materials fabrication and performance testing of advanced high-temperature, corrosion-resistant structural ceramic composites and metal alloys. The site is internationally recognized for its leadership in designing, developing, and deploying advanced materials for use in energy applications and extreme service environments. NETL is renowned for its ability to design, engineer, and evaluate materials at size and time regimes ranging from atomistic to pilot-plant scales.

Over the years, scientists and engineers working at NETL's Albany site have been awarded numerous patents, and have substantially contributed to the fields of metals and minerals research. The Albany complex is in proximity to two major universities, Oregon State University and the University of Oregon, which provides opportunities for research collaboration. In addition, it is located in the heart of the reactive and other high-temperature metals industries so critical to the Nation's economic health. Several of these industries were spun out of research done at this Laboratory or were brought into existence by the Laboratory and the metals manufacturers located in the vicinity.

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NETL's Albany lab traces its origins to 1943 when President Franklin D. Roosevelt announced that the U.S. Bureau of Mines had selected Albany as the site for the new Northwest Electro-Development Laboratory. The original mission of the Laboratory was to find methods for using the abundant low-grade resources in the area and to develop new metallurgical processes using the ample electrical energy in the area. In 1995, Congress closed the U.S. Bureau of Mines and transferred the Laboratory in Albany to the Department of Energy's Office of Fossil Energy. In late 2005, the Albany Research Center was reorganized to become part of NETL. This action aligned the Albany laboratory's expertise in materials performance and process development with NETL's mission to discover, integrate, and mature technology solutions to enhance the nation's energy foundation and protect the environment for future generations.

The Laboratory has a rich history in energy innovation and has made significant contributions in the areas of materials research. In 1984, ASM International, the world's largest and most established materials information society, recognized the laboratory for pioneering the process of making ductile zirconium and designated the site an ASM Historic Landmark. More recent contributions include: development of radiopaque alloys for medical coronary stents; enhanced processing methods to improve armor materials for military applications; computational tools for heat treating and homogenization processing of superalloys; development of improved heat-resistant alloys; and development of modified chrome-oxide refractory brick material for slagging gasifiers.

NETL Albany continues to be a leader in developing structural materials for extreme environments. NETL's capability is anchored by its substantial alloy fabrication and performance testing facilities, which deliver high-performance, affordable materials that enable diverse energy technologies. Researchers specialize in the design, synthesis, fabrication and manufacturing, performance assessment, and performance prediction of corrosion- and heat-resistant alloys and ceramics and refractories for structural and environmental protection applications. Research focuses on cost-effective materials for severe stress and corrosive/erosive environments with service life of 100,000 hours. NETL maintains a complete alloy development research facility, which includes an alloy fabrication laboratory for prototyping alloy manufacturing (unique in the national lab complex) with capabilities for melting, casting, forging, rolling, and heat-treating materials ranging in size from a few grams to 100 kilograms. NETL's capability also includes the Severe Environment Corrosion Erosion Research Facility and related laboratories for assessing materials performance in simulated fossil fuel environments at high temperatures and pressures. Complementary computational materials research is integrated into these activities to guide alloy development and manufacturing research, and to predict materials performance to shorten development timelines.

NETL Albany has recently expanded its geoscience and geomaterials science capabilities to better understand and characterize engineered/natural systems related to fossil energy such as conventional and unconventional hydrocarbons both onshore and offshore, natural gas hydrates, and geothermal systems. This includes the multi-functional, state-of-the-art facility High Pressure Immersion and Reactive Transport Laboratory capable of performing geological studies at simulated depths up to 10,000 feet, providing an experimental basis for modeling various subsurface phenomena and processes.

NETL's Geospatial Analysis, Interpretation and Assessment (GAIA) Computational Facility enables connectivity and real-time collaboration among NETL's three research sites to visualize, interpret, analyze, and model geoscience (geology, geophysics, geochemistry) and geospatial data sets. The GAIA facility develops advanced geoprocessing-big data computing-HPC capabilities, and is custodian of NETL's first big data computing cluster in support of NETL's geo-data science R&D.