

# NATIONAL ENERGY TECHNOLOGY LABORATORY ALBANY, OREGON



# NETL

## NATIONAL ENERGY TECHNOLOGY LABORATORY

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 metallic and other materials in real time on site. NETL can test material quantities ranging from a few atoms to pilot-plant scales.

Over the years, scientists and engineers working at NETL's Albany site have been awarded numerous patents, and they have substantially contributed to the fields of metals and minerals research. The Albany complex is in close proximity to Oregon State University and the University of Oregon, providing opportunities for extensive research collaboration with scientists in academia. In addition, the Albany facility is situated in the heart of the reactive and other high-temperature metals industries which are so critical to the nation's economic health. Several of these industries in the region have evolved out of research done at this laboratory.







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 of metals. They also conduct performance assessment and performance prediction of corrosion-resistant and heat-resistant alloys, ceramics, and refractories for structural and environmental protection applications. Research focuses on cost-effective materials for severe stress and corrosive/erosive environments with the goal of ensuring materials' service life of up to 100,000 hours.

NETL maintains a complete alloy development research facility, which includes a unique national alloy fabrication laboratory for prototyping alloy manufacturing. This lab retains capabilities for melting, casting, forging, rolling, and heat-treating materials ranging in size from a few grams to 200 kilograms.

The NETL Albany lab 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. Our ultimate goal is to

# NATIONAL ENERGY TECHNOLOGY LABORATORY ALBANY, OREGON

[www.NETL.DOE.gov](http://www.NETL.DOE.gov)

guide alloy development and manufacturing research and to predict material performance in order to shorten development timelines.

Over the past decade, NETL Albany has expanded its geoscience and geomaterials science capabilities to better understand and characterize both engineered and natural systems related to fossil energy. This includes conventional and unconventional hydrocarbons onshore and offshore, as well as natural gas hydrates and geothermal systems. For more information, see: <https://netl.doe.gov/oil-gas/natural-gas-resources>. This includes the multi-functional, state-of-the-art facility High Pressure Immersion and Reactive Transport Laboratory, which is 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 of big data, high-performance computing capabilities. Furthermore, GAIA is the custodian of NETL's first big data computing cluster in support of our geo-data science research and development.

The design of a new Advanced Alloys Signature Center (AASC) is currently underway at the Lab in Albany. Over the next four years, the AASC will synergize the efforts of

industry, U.S. government agencies (including other national laboratories) and research universities to prototype alloy solutions.

The AASC will drive the development of next-generation, high-performance materials needed to generate affordable, clean electricity, support growth in emerging U.S. industries and strengthen America's position as a world leader in alloy design and production. The center's capstone investment will be a National Fire Protection Association-compliant melting facility that can process most alloys, including reactive metals such as titanium alloys and refractory alloys such as niobium. For more information about the AASC, see: <https://go.usa.gov/xerpw>

NETL is a U.S. Department of Energy national laboratory that drives innovation and delivers technological solutions for an environmentally sustainable and prosperous energy future. Through its world-class scientists, engineers and research facilities, NETL is ensuring affordable, abundant and reliable energy that drives a robust economy and national security, while developing technologies to manage carbon across the full life cycle, enabling environmental sustainability for all Americans, advancing environmental justice and revitalizing the economies of disadvantaged communities. Leveraging the power of workforce inclusivity and diversity, highly skilled innovators at NETL's research laboratories in Albany, Oregon; Morgantown, West Virginia; and Pittsburgh, Pennsylvania conduct a broad range of research activities that support DOE's mission to ensure America's security and prosperity by addressing its energy and environmental challenges through transformative science and technology solutions.



