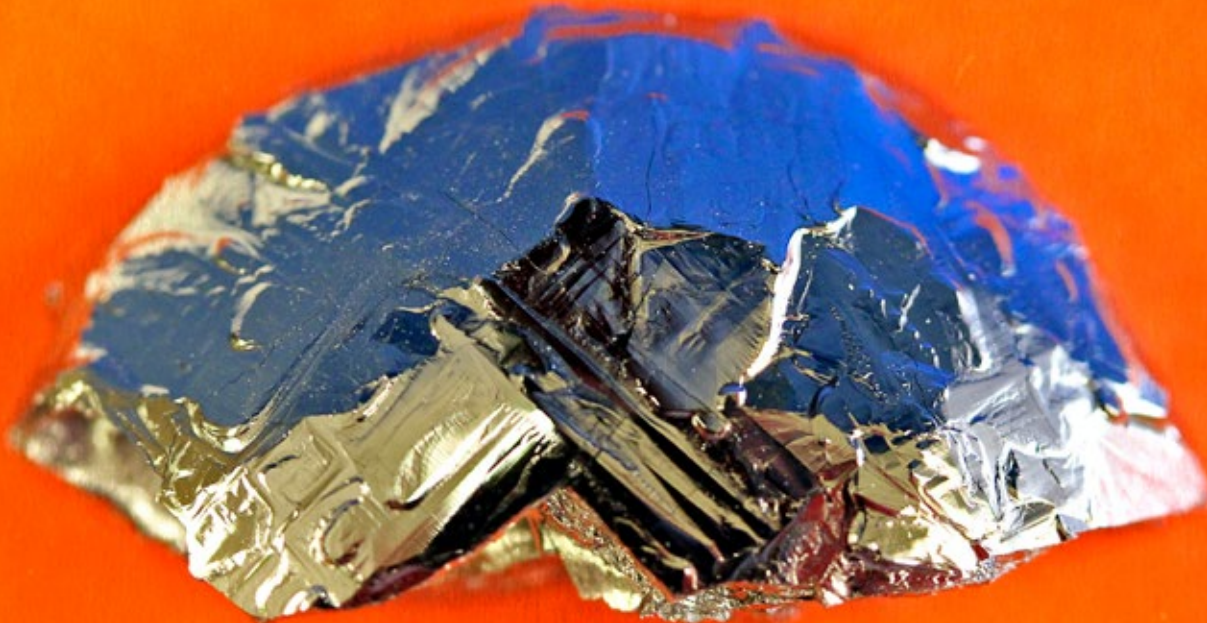


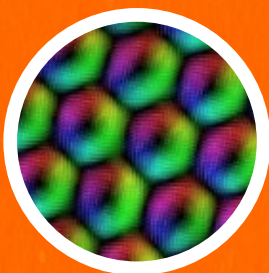


Creating Materials & Energy Solutions
U.S. DEPARTMENT OF ENERGY

» **Ames Laboratory** is a world-class institution dedicated to creating materials, inspiring minds to solve problems, and addressing global challenges. Located in Ames, Iowa on the campus of Iowa State University, **we are global leaders in the discovery, synthesis, analysis, and application of new materials**, novel chemistries, and transformational analytical tools.



We create materials and energy solutions.



» We conduct **fundamental and applied research** that helps the world to better understand the nature of the building blocks that make up our universe, and we translate that knowledge into new and unique **materials, processes, and technologies** that advance the nation's economic competitiveness and enhance national security.

What We Do

Science of Synthesis

We are experts in the **science of synthesis**. The frontier of materials science is now predicting and achieving tailor-made material properties by precisely directing atoms into unique architectures. Our research accelerates the discovery of the next generation of energy materials.

Science of Quantum Materials

We stand at the forefront of **quantum materials**. Understanding quantum phenomena in materials holds the potential for the next technological revolution in information devices and computing. Our research leads the way in discovering novel quantum materials and exploring the means to manipulate and control their properties.



Science with Rare Earths

We continue a more than 70-year reputation of excellence in **science with rare earths**. Our research focuses on rare earths as critical components in a wide range of current and emerging technologies, and on developing new fabrication and recycling processes that address the supply and demand concerns of U.S. industry.

Science of Interfaces

Our research pursues fundamental knowledge to control and manipulate chemical processes at complex interfaces, including understanding how solvents affect chemical reactions and how molecules diffuse on surfaces at the nanoscale. We discover more efficient chemical reactions, and new ways to convert energy. Our expertise in computational theory and exascale computing will accelerate our discoveries into the future.





We apply our science.

Through **multi-institutional collaborations, industry partnerships, and technology licensing**, we have a proven track record of transitioning basic energy science through early-stage research to commercialization.

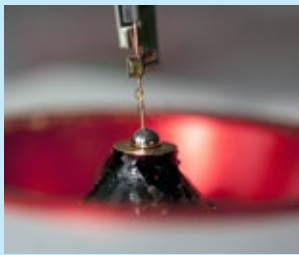


We share our science.

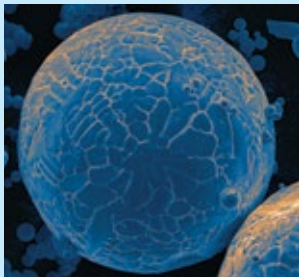
Ames Laboratory invests in the future of science through **education** programs and mentorships which nurture undergraduate, graduate, postdoctoral, and early career scientists. Our **outreach** programs are designed to promote early interest in STEM fields to K-12 students in the state of Iowa.



Success Stories



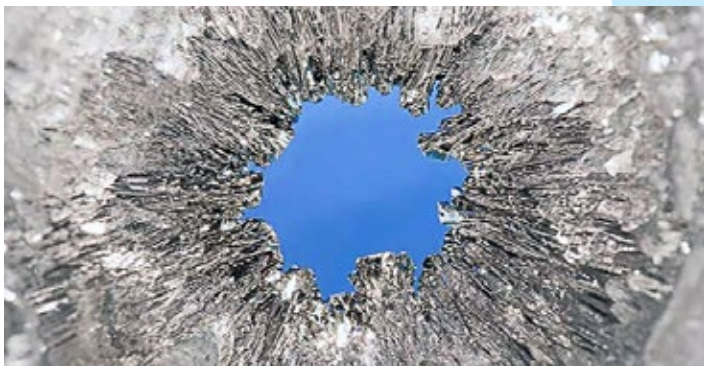
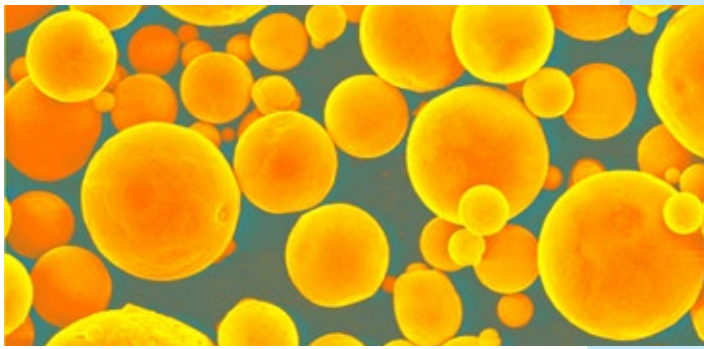
A **lead-free solder alloy** formula developed at Ames Laboratory has been licensed to over 65 companies worldwide, and is now considered the preferred solder by the global electronics assembly industry. It was the first cost-effective, broadly usable and non-toxic alternative to lead solder and can be found in most new consumer electronic items, including cell phones, computers, and TVs.



Ames Laboratory's specialized **gas atomization** method efficiently produces customizable metal powders for advanced manufacturing. The process has resulted in numerous patents and led to a spin-off company, Iowa Powder Atomization Technologies, that was later acquired by the Fortune 500 company Praxair as part of a major commercialization effort.



Ames Laboratory's Critical Materials Institute has developed a **recycling process** that turns discarded hard disk drives into new magnetic material. The process helps mitigate the environmental and economic obstacles typically associated with mining e-waste for valuable materials.



Unique Facilities:

The **Critical Materials Institute** is an Energy Innovation Hub working to enhance and diversify production, develop substitutes, and recycle rare-earth metals and other materials critical to the nation's energy security.

The **Materials Preparation Center** is a specialized metals synthesis and characterization facility internationally recognized for the Ames Process, a preparation technique for rare earth metals which was originally developed here under the Manhattan Project.

The **Sensitive Instrument Facility** houses state-of-the-art electron microscopes in a vibration- and static-free environment, ensuring the highest possible resolution.

The **Powder Synthesis and Development Facility** provides expanded use and application of metallic powders for advanced manufacturing through design, testing, production, and analysis, at experimental and pilot scale.

Dynamic Nuclear Polarization NMR offers drastically higher sensitivity and faster data acquisition than conventional NMR technology—providing new insights into the physical, chemical, and electronic properties of materials.

At a Glance:

Year founded: 1947

Type: U.S. Department of Energy, single program

Contractor: Iowa State University of Science and Technology

Employees: 473

Annual budget: \$60 million

Director: Adam Schwartz

Location: 2408 Pammel Drive, Ames, IA 50011-1015

Contact: science@ameslab.gov

Website: www.ameslab.gov

Core Capabilities:

Applied materials science and engineering

Chemical and molecular science

Condensed matter physics and materials science



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