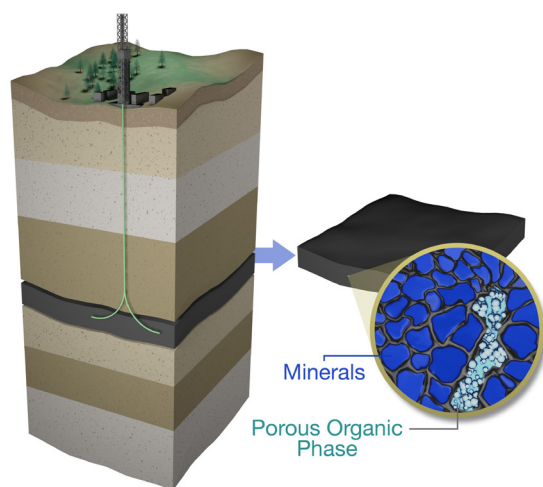


No neutron science experience is necessary

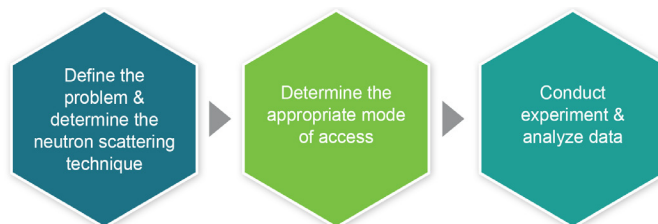
Oak Ridge National Laboratory's Neutron Sciences User Program invites you to collaborate, onsite or remotely, to achieve greater research success.

Beam time is granted through a proposal system managed by the User Program. No neutron science experience is necessary, as ORNL's experts work closely with users at every step to ensure the success and safety of their experiments.



Chevron Corporation conducted SANS neutron experiments at HFIR to gain a better understanding of how shale nanoporosity and permeability can be used to improve hydrocarbon recovery strategies.

The Industrial Applications Program



ORNL's Neutron Sciences Industrial Applications Program helps industry users navigate the process of developing a problem-solving plan using neutrons to answer their material and product research questions.

IAP also provides scientific support with instrument selection, experiment design, sample environment and preparation.

Finally, the IAP can assist in neutron data analysis and interpretation.

Contact:

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Industrial Liaison

Web: neutrons.ornl.gov/industry

Email: neutronusers@ornl.gov

Phone: 865-574-4600 or 865-341-4451



U.S. DEPARTMENT
of **ENERGY** | Office of
Science

25-GO1270

Neutron Scattering for Industry

Helping industry analyze and develop materials and processes



US Department of Energy

Oak Ridge National Laboratory
Oak Ridge, Tennessee

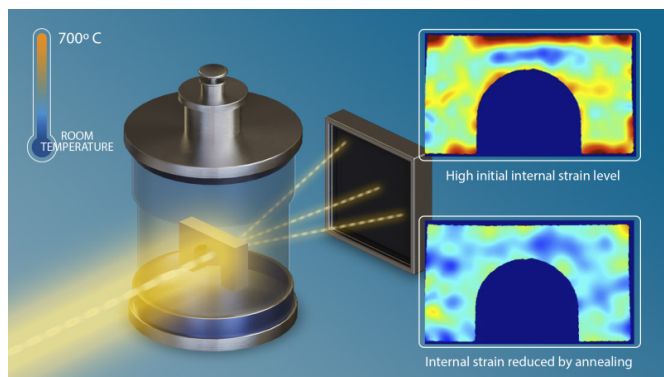
Managed by UT-Battelle LLC
for the US Department of Energy

Neutrons can support your research at little or no cost*

Neutron research at Oak Ridge National Laboratory can non-destructively penetrate and characterize almost any product and material, from metals and bulk samples to biological and quantum materials.

Scattering data can be captured and analyzed in real-time across a wide range of time and length scales, down to the atomic level, and in a wide range of environments – even during product operation and process activities.

*Access to the neutron facilities is free of charge (except for travel costs, if necessary) when researchers intend to publish their results to the scientific community.



General Electric (GE) used additive manufacturing to produce sample parts for neutron experiments. The neutrons easily penetrated the vacuum furnace walls and imaged the entire bulk part as the internal strain was relieved.

Over 30 world-class neutron instruments at your disposal

The Industrial Applications Program assists new and experienced users in designing experiments and using any of more than 30 world-class neutron instruments offering diffraction, reflectometry, small-angle neutron scattering, spectroscopy and neutron radiography.

Users can conduct experiments onsite at Oak Ridge National Laboratory or through secure remote sample handling and data collection.

A partial list of materials and characteristics that neutrons can probe and measure:

Reactor vessels: Precipitate formation and materials radiation resistance

Nuclear fuel cladding: Hydride formation and phase transformation of claddings

Uranium and uranium alloys: Thermo-mechanical deformation

Materials performance: In extreme temperature, pressure and magnetic fields

Residual stress: In conventional and additively manufactured components

Welding: Real-time analysis

Polymers & electrolytes: Most soft matter

Deformation and phase transformation

Biological processes and structures

Drug development and interactions

ORNL is centrally located in the southeastern U.S.

Oak Ridge National Laboratory hosts two of the most powerful, complementary neutron sources in the world — the High Flux Isotope Reactor (HFIR) and the Spallation Neutron Source (SNS).

Many industrial users employ neutron scattering to reveal and improve the properties of their products and materials.

Neutron research has helped industry solve a range of diverse and challenging problems across many sectors, including aerospace, pharmaceutical, defense, automotive, oil and gas, and manufacturing.

Just a few of the industrial users that ORNL has partnered with:

- | | |
|-------------------------|--------------------|
| ● 3M | ● Honeywell |
| ● Bayer Pharma | ● JFE Steel |
| ● Chevron Corp. | ● NASA |
| ● Corning Inc. | ● Northrup Grumman |
| ● Cummins | ● Pratt & Whitney |
| ● DuPont | ● BASF |
| ● ExxonMobil | ● Toyota |
| ● Ford Motor Co. | ● U.S. Steel |
| ● General Dynamics | ● U.S. Army |
| ● General Electric (GE) | ● U.S. Navy |
| ● General Motors (GM) | |