

Automatic Gas Sorption Technology

Benefits

- ▶ The apparatus can examine nanogram or microgram-scale quantities of materials of interest and can do so automatically and unattended.
- ▶ The apparatus can be programmed to run single or multiple isotherms simultaneously at various low/high temperatures and pressures.
- ▶ Automatic Pressure Concentration Temperature (PCT) Isotherms can be provided in a period of a few hours.
- ▶ Quick and precise material characterization of all sample scales (nm-micro) of different weight and compositions.
- ▶ Small footprint apparatus can be coupled with other non-contact devices (e.g. magnetic induced heating device) to study the controlled release of gases.

Applications and Industries

- ▶ Metal hydride material characterization.
- ▶ Hydrogen isotope sorption studies.
- ▶ Extent of life studies for hydride materials.
- ▶ Any commercial industries and markets working with gas absorption-desorption studies can benefit from this device.
- ▶ This is of interest for DOE, NNSA, Tritium or Weapons Facilities.

Technology Overview

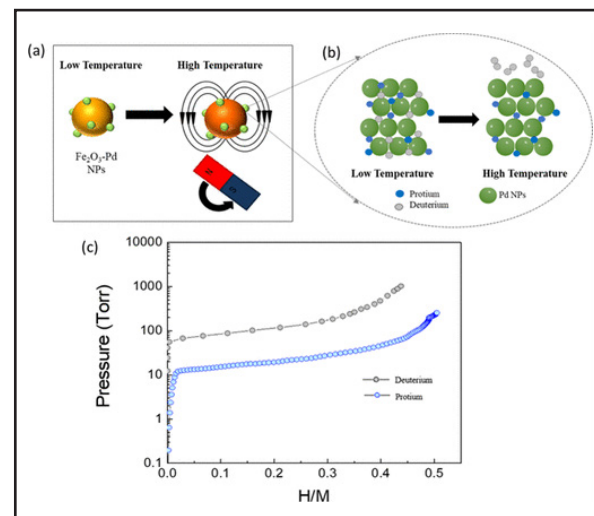
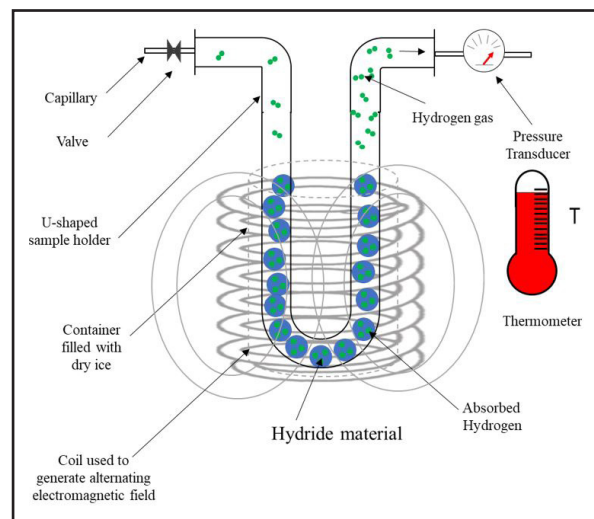
Savannah River National Laboratory has developed an automatic gas absorption-desorption technology for delivering a controlled amount of gas to a sorption material. This technology is automatically controlled to deliver predetermined aliquots of gas, generate isotherm measurements, and evaluate the kinetics and thermodynamic behavior of a very small amount of material at various temperatures and pressures.

Description

The ability to characterize a material's sorption capacity is important, especially in the world of metal hydrides. Knowing the storage properties of a hydride material can tell a lot about how well the materials perform under certain conditions. This invention facilitates that ability by automatically controlling a gas manifold system to collect the data that describes the material's sorption properties. The amount of gas loaded to the material sample holder can be controlled as well as the temperature of the material under study. This allows for multiple materials to be studied under the same conditions to compare material performance. This apparatus also has a small footprint and allows for very small amounts of material to be loaded with micromoles of gas at low pressures. Materials can safely and quickly be characterized under many different conditions which makes this apparatus a simple, viable solution for studying gas sorption properties of various materials.

Contact Information

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Technology transfer

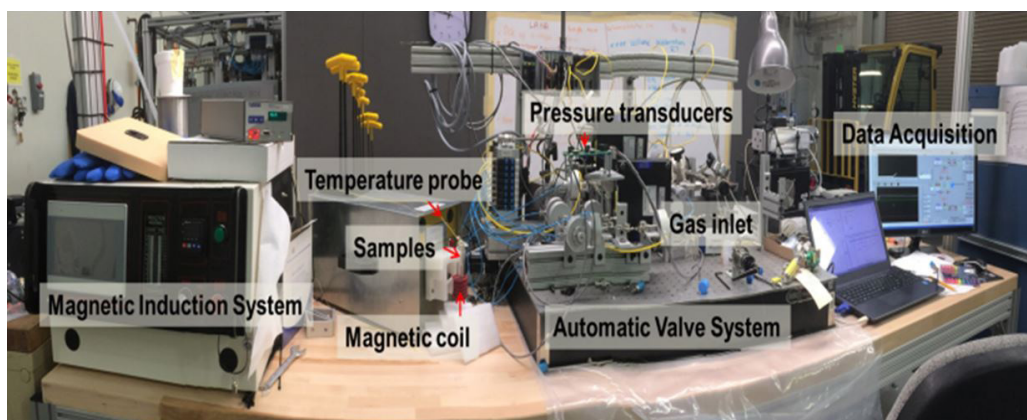
The Savannah River National Laboratory (SRNL) is the U.S. Department of Energy's (DOE) applied research and development laboratory at the Savannah River Site (SRS).

With its wide spectrum of expertise in areas such as homeland security, hydrogen technology, materials, sensors, and environmental science, SRNL's cutting-edge technology delivers high dividends to its customers.

The management and operating contractor for SRNL is Battelle Savannah River Alliance, LLC. BSRA is responsible for transferring its technologies to the private sector so that these technologies may have the collateral benefit of enhancing U.S. economic competitiveness.

Contact Information

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Automatic Gas Isotherm Apparatus Coupled with Magnetic Induced System

Intellectual Property

- This technology and methods for its use have been granted U.S. Patent No. 11,307,129 (April 19, 2022), "Automatic Gas Sorption Apparatus and Method" and is available for licensing.

Partnering opportunities

SRNL invites interested companies with proven capabilities in this area of expertise to develop commercial applications for this process under a cooperative research and development agreement (CRADA) or licensing agreement. Interested companies will be requested to submit a business plan setting forth company qualifications, strategies, activities, and milestones for commercializing this invention. Qualifications should include past experience at bringing similar products to market, reasonable schedule for product launch, sufficient manufacturing capacity, established distribution networks, and evidence of sufficient financial resources for product development and launch.