Magnetic Gas Sensor and Methods Using Antiferromagnetic Hematite Nanoparticles
U.S. Patent Issued - 7,836,752
BSU File Reference #18

Abstract

Hydrogen sensing is a critical component of safety necessary to address widespread public perception of the hazards of the production, storage, transportation and use of hydrogen in proposed future automobiles and in various other applications. The present invention meets the need for a nanoscale hydrogen sensor.

Boise State University has invented a small hydrogen gas sensor with greater sensitivity than sensors currently available. The device uses nanoparticles of a magnetized iron oxide with a net zero magnetic field since the particles’ magnetic fields cancel out. As the concentration of hydrogen gas increases in the device the magnetic properties change in a predictable way. Those changes can be measured indicating the concentration of hydrogen present. This technology allows for rapid miniaturization of current bulky hydrogen sensors, allowing them to be used in micro and nanoscale devices that might be employed in hydrogen fueled automobiles or other portable devices. Other gases might also be detected since the mechanism that changes the magnetic properties is reduction (where an electron is gained) and the device could be calibrated to detect other gases.

Advantages

- The device detects hydrogen so leaks can be detected before an explosion happens.
- The device detects gases by changes in magnetic fields which do not require electrical contacts so the device can be smaller than electrical devices and it will not corrode.
- The device uses many nanoparticles giving it a higher surface area to mass ratio making it possible to create a smaller device with better sensitivity (for hydrogen powered automobiles or other portable gas carrying devices).

Stage of Development

This technology is developed and a patent has issued.

Boise State is looking for a Licensee for this technology.

For More Information Contact:
Katy Ritter
Assistant Director, University and Industry Ventures
Research and Economic Development
(208) 426-5765
KatyRitter@boisestate.edu

Boise State University ● Research and Economic Development ● University and Industry Ventures
http://research.boisestate.edu/uiv/