produces materials with high specific surface area, which must be accounted for when comparing reactivities of materials prepared by different routes. Overall, compositions such as $BaCe_{0.7}Zr_{0.2}Nd_{0.1}O_3$ provided a good compromise between high stability and high conductivity.

These combinations also show a potential improvement in fuel cell performance, since they allow lower operation temperatures than ZrO_2 electrolytes. Doped perovskites oxides obtained with different chemical characteristics will make it possible to obtain a range of materials with competitive conditions to be used in fuel cell applications.

SIARI S. SOSA

Infrared Absorption Measurements Confirm the Existence of an Isolated Hydrogen Defect in Proton-Implanted Germanium

An international research team from the Institute of Physics and Astronomy of Aarhus University in Denmark and the Department of Physics and Astronomy of Vanderbilt University in Nashville, Tennessee has identified the origin of two isolated hydrogen defects in high-resistivity, ultrapure Ge single crystals implanted with protons at cryogenic temperatures. As reported in the October 2 issue of *Physical Review Letters*, the samples were implanted with protons and/or deuterons at multiple energies, yielding uniform concentration profiles, with widths between 20 and 200 μm. The samples were cooled to either 20 or 80 K during implantation. During the transportation from the implantation site to the infrared spectrometer, the samples were kept continuously cooled to within 10 K ofthe implantation temperatures, and the *in situ* infrared absorption (IRAS) measurements were performed at ~10 K with a spectral resolution better than 0.8 cm^{-1}.

From the IRAS measurements, two distinctive lines were obtained: 745 cm^{-1} and 1794 cm^{-1}. While the properties of the 1794 cm^{-1} mode are similar to the stretch mode of bond center H in Si, the 745 cm^{-1} has no Si analogue. Two different approaches have shown that the two lines originate from different defects. From isochronal annealing, the line at 745 cm^{-1} starts to decrease at 100 K while the 1794 cm^{-1} line anneals at 210 K. Varying the H concentration has shown that the intensity of the 1794 cm^{-1} line is proportional with the concentration of hydrogen over the whole range covered, while the intensity of the 745 cm^{-1} line maintains the proportionality just below 2×10^{18} cm^{-3}, at which it saturates.

From stress measurements and symmetry considerations, the line at 1794 cm^{-1} is attributed to $H_{BC}^{(+)}$ in Ge. For the line observed at 745 cm^{-1}, the measurement seems to support the idea of an isolated H located on a <111> axis of the Ge lattice, and vibrating perpendicular on this axis, corresponding to an isolated $H^{(-)}$ near the tetrahedral site. Although predicted by theory more than a decade ago, this work provides direct observation of this isolated hydrogen species in a semiconductor.

CLAUDIU MUNTELE

Hänsch Receives ICALEO® 2000 Schawlow Award

Theodor W. Hänsch, director of Max-Planck-Institute for Quantum Optics and professor of physics at the University of Munich, Germany, has been named the Arthur L. Schawlow Award recipient by the Laser Institute of America in recognition of his pioneering research in high resolution laser spectroscopy. He is recognized worldwide as the initiator of research testing basic physics laws with techniques of precise laser spectroscopy and the cooling and manipulation of atomic matter with laser light. Hänsch was the Honored Speaker at the Awards luncheon of the 19th International Congress on Applications of Lasers & Electro-Optics (ICALEO®) held October 2–5 in Dearborn, Michigan.

Chain T. Liu Receives 2001 Acta Metallurgica Gold Medal

The 2001 Acta Metallurgica Gold Medal has been awarded to **Chain T. Liu**, Senior Corporate Fellow at Oak Ridge National Laboratory. Liu is world renowned for his leadership and outstanding achievements in research on ordered intermetallics based on aluminides and silicides. He has played a key role in advancing the science and developing the technology of intermetallic alloys for use as new structural materials. Liu will be presented with the medal on February 13, 2001 in New Orleans during the 130th TMS Annual Meeting. □

https://doi.org/10.1557/mrs2000.243 Published online by Cambridge University Press