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Crystalline  $\alpha$ -samarium sesquisulfide nanowires: structure and electronic properties of an unusual intrinsically degenerate semiconductor CHRIS MARIN, JOSEPH BREWER, CHIN LI CHEUNG, Department of Chemistry, University of Nebraska-Lincoln, Lincoln, NE 68588, LU WANG, WAI-NING MEI, Department of Physics, University of Nebraska at Omaha, Omaha, NE 68182 — We report that  $\alpha$ -phase samarium sesquisulfide ( $\alpha$ -Sm2S3) intrinsically takes on an electronic structure similar to that of a heavily degenerate p-type semiconductor by means of UV-Vis absorption spectroscopy and first-principles calculations. When prepared by chemical vapor deposition, these samples were found to have a tendency to crystallize as bundles of nanowires. Additional characterizations using high-resolution electron microscopy, along with selected area electron diffraction and X-ray diffraction, were applied to verify the matching of the modeled structure of  $\alpha$ -Sm2S3 to that of the experimentally measured material. We expect this compound to be intrinsically well suited for potential applications in the p-type elements of diode devices such as in photovoltaic devices and thermo-electric converters.

> Wai-Ning Mei Department of Physics, University of Nebraska at Omaha, Omaha, NE 68182

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