

PVT Measurements of Hydrogen at High Pressures

Naoya Sakoda ^{C, S}

Hydrogen Technology Research Center, Kyushu University, Fukuoka, Japan

Kenta Shindo

Department of Mechanical Engineering Science, Kyushu University, Fukuoka, Japan

Kan'ei Shinzato

HYDROGENIUS, National Institute of Advanced Industrial Science and Technology (AIST), Fukuoka, Japan

Masamichi Kohno

Department of Mechanical Engineering Science, Kyushu University, Fukuoka, Japan

Yasuyuki Takata

Department of Mechanical Engineering Science, Kyushu University, Nishi-ku, Fukuoka, Japan

Motoo Fujii

HYDROGENIUS, National Institute of Advanced Industrial Science and Technology (AIST), Fukuoka, Japan

Hydrogen energy is expected to be a next generation clean energy. However thermophysical property data for hydrogen is not sufficient, and new accurate data are desirable in the high temperature and high pressure region. A new research facility, which is specially designed for experiments with hydrogen at pressures up to 100 MPa, has been constructed in order to do the experiments effectively and safely. A PVT measurement apparatus by the Burnett method from room temperature to 250 °C and up to 100 MPa has been developed with a remote operation system. The Burnett method uses two cells; a sample cell and an expansion cell. The sample is expanded from the sample cell into the expansion cell at constant temperature repeatedly. Densities are calculated from the pressure measurements before and after the expansions. It is not necessary to measure the mass of the sample and the volumes of the two cells. Higher accuracy is expected in the low density region. The PVT measurements of hydrogen at 60 °C and 100 °C up to 5 MPa and at 80 °C up to 96 MPa were performed. These results will be reported.