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Structural change in hBN coexisting with hydrogen gas under pressure ATSUKO NAKAYAMA, Center for Transdisciplinary Research, Niigata University, SHOTARO TAGUCHI, Graduate School of Science & Technology, Niigata University, SHOHEI MITSUYA, Department of Physics, Faculty of Science, Niigata University, TAKASHI TANIGUCHI, SATOSHI NAKANO, National Institute for Materials Science (NIMS), AYAKO OHMURA, Center for Transdisciplinary Research, Niigata University, FUMIHIRO ISHIKAWA, YUH YAMADA, Department of Physics, Faculty of Science, Niigata University — Hexagonal boron nitride (hBN) has the layered structure as graphite, while the magnitude of band gaps is very large (∼0.59 eV). It is thought that hBN hardly causes charge transfer interaction with any atoms or molecules. On the other hand we examined pressure-induced structural-changes in multi-walled carbon-nanotubes (MWCNTs) and meso-carbon micro-beads (MCMBs) coexisting with hydrogen gas using a diamond anvil cell (DAC) at room temperature. Both of them showed abnormal pressure dependence of in-plane graphite-structure, suggesting intercalation of hydrogen. Then we thought hBN has also possibility to cause the intercalation of hydrogen using pressure. In this study x-ray diffraction of hBN coexisting with hydrogen was carried out at room temperature to investigate the pressure-induced intercalation of hydrogen from the point of view of structural study. Not only the interlayer distance but also the a-axis length show abnormal pressure dependence up to 1.5 GPa. In particular the a-axis length increases with increasing the pressure in the range between 1 and 1.5 GPa. According to the relatively-low quantitative-reproducibility of change, it is thought that the hBN-hydrogen system takes an un-steady and non-equilibrium state.

Atsuko Nakayama
Center for Transdisciplinary Research, Niigata University

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