

Abstract Submitted
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High energy-resolution electron energy-loss spectroscopy and x-ray emission spectroscopy studies of amorphous diamond transformed from neutron-irradiated graphite YOHEI SATO, MASAMI TERAUCHI, Tohoku University, KEISUKE NIWASE, Hyogo University of Teacher Education, KAZUTAKA G. NAKAMURA, TOSHIYUKI ATOU, Tokyo Institute of Technology, TADAO IWATA, University of Tokyo — Specimens for transmission electron microscopy were prepared from amorphous diamond, which was synthesized from neutron-irradiated graphite by shock compression. High energy resolution EELS measurements were performed by using a monochromator transmission electron microscope (TEM). XES measurements were performed by using a wavelength-dispersive type spectrometer for soft x-ray attached to the monochromator TEM. A volume plasmon peak of am-DIA is observed at 32.5 eV, which is slightly located at lower energy than that of c-DIA. Since the plasmon energy is dominantly proportional to square root of valence electron density, the lower plasmon energy of am-DIA indicates that the valence electron density of am-DIA is smaller than that of c-DIA. Also, it is revealed that the band gap energy of am-DIA is 4.0 eV, which shows good agreement with the estimation of 3.9 eV from the onset energy of valence-electron excitation spectrum.

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