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Structure and electronic properties of nanodiamond and its fluorination effect KAZUYUKI TAKAI, KENTA KOGANE, Hosei University, HIDEKAZU TOUHARA, YOSHIYUKI HATTORI, Sinshu University — Fluorination of nano-sized diamond (ND) is expected not only to stabilize the surface structure, but also to introduce functional groups on the surface, the conduction carriers, and so on. In this study, we evaluate the structure and magnetic properties of ND and fluorinated ND (FND) in order to consider the change in the electronic state and the surface structure by fluorination. Fluorination of ND was carried out by the direct reaction between gaseous fluorine (1 atm) and commercially available detonation diamond at 623 – 873 K. X-ray Diffraction study reveals the structural stability of core part of ND during fluorination. X-ray photoemission spectroscopy exhibits F1s peak at the lower binding energy region than that for physisorbed molecular fluorine, indicating the formation of the chemical bonding between C and F in the sample. The Electron Paramagnetic Resonance results suggest that fluorination induces not only changes in the surface structure but also relaxation of defects in the core part.

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