Geodynamics Seminar

第315回ジオダイナミクスセミナー

"Optical properties of nano-polycrystalline diamond synthesized and treated under various high pressure and high temperature conditions"

Futoshi Isobe (Ph.D. student, Ehime University)

主催：愛媛大学地球深部ダイナミクス研究センター
日時：1/27（金）午後 4時30分～
場所：総合研究棟 4F 会議室

Abstract

Nano-polycrystalline diamond (NPD) synthesized by direct conversion from graphite under high pressure and high temperature possesses unique optical properties compared with single crystalline diamond. NPD shows characteristic brownish yellow color to our eyes because of the relatively weak continuous absorption starting from about 700nm and the strong absorption starting from about 480nm in the visible light region, (Sumiya et al. 2009). Nitrogen is known to be a major impurity in diamond and provides crystals specific absorption bands depending on its aggregation form in crystal structure. Although NPD contains a small amount of nitrogen in aggregated forms of A (pair of N atoms), N3 (three N atoms with a single vacancy) and B (four N atoms surrounding a single vacancy) centers, none of them can explain the strong absorption starting from 480nm. This absorption is presumably attributed to its nano-polycrystalline structure itself (i.e. grain boundaries). In order to understand the origin of the coloration of NPD, the correlation between its microtexture and optical properties were investigated. NPD samples having different grain sizes were prepared by annealing of as-synthesized products in the stability region and by synthesizing directly from highly crystalized graphite using a Kawai-type apparatus. Microtexture and optical properties of these samples were examined by TEM, UV-Vis, IR and PL spectroscopic measurements. The details of the experimental results will be presented in the seminar.

詳細は当センターホームページ: http://www.ehime-u.ac.jp/~grc/をご覧ください
問い合わせ先：桑山 靖弘（TEL:089-927-8408,e-mail:kuwayama@sci.ehime-u.ac.jp）