

Growth and characterization of nanocrystalline diamond films on sapphire and SiC substrates

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Wide bandgap semiconductor materials have been recognized by their superior electronic and physical properties in comparison with traditional semiconductors, such as Si, Ge and GaAs. Among the wide bandgap semiconductors, diamond exhibits the greatest potential to be employed in the development of electronic and sensor devices for harsh environment applications. In the first studies on these devices, the focus was on diamond films grown on Si substrates due to well-established Si microelectronics technology. Most recently has been shown that sapphire and silicon carbide (SiC) substrates are very attractive for high-performance diamond-based devices [1, 2]. Here we report the growth conditions of diamond thin films on these substrates by hot filament chemical vapor deposition (HFCVD) technique. Characterization of the films was performed by Raman spectroscopy, XRD, FEG-SEM, and four-point probe. The structural, morphological and electrical properties of the diamond films on sapphire and SiC have been compared.

[1] M. Yoshimoto, K. Yoshida, H. Maruta, Y. Hishitani, H. Koinuma, S. Nishio, M. Kakihana, T. Tachibana, *Nature* **399**, (1999) 340.

[2] S Chowdhury, E de Barra, M.T Laugier, *Diamond and Related Materials* **13** (2004) 1625.