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Synthesis and modification of Boron Nitride nanotubes using ion implantation

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In this work, Chemical Vapour Deposition (CVD) has been used to synthesize boron nitride (BN) nanostructures, particularly nanotubes, and defects selectively introduced into the synthesized BN nanostructures through ion implantation. Scanning electron microscopy (SEM) images show clear evidence of BN nanostructures and BN nanotubes (BNNTs), with the latter appearing as long, thin structures with diameters ranging from 30-90 nm. Raman analysis shows an E_{2g} mode of vibration assigned to hexagonal BN (hBN) at 1366 cm^{-1} after ion implantation, with increased intensity. Grazing incidence X-ray diffraction (GIXRD) spectra revealed a prominent peak, a (004) hBN characteristic peak, present in the 54° - 56° angle region, which was used to determine the average lattice parameters ($a=2.23$ and $c=3.64$ Å), crystallite size 5.60 nm and density (1.75 g/cm^3) of BN nanostructures. The most notable observation in this study was a significant rise in the size of the crystallite domains in the nanostructures synthesized at 1100 and 1200°C after ion implantation with boron ions at fluence 5×10^{14} ions/ cm^2 .

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

PhD

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