

Nucleation and Growth of Boron Nitride Nanotubes

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Boron nitride nanotubes (BNNTs) have been predicted to have high thermal conductivity but electrically insulating material and thermally stable at high temperature indicating the promise for wide range applications. A range of methods have been explored to study the synthesis of BNNTs. However, insufficient fundamental studies are available particularly the nucleation and growth of BNNTs. Here, we present the synthesis mechanism of BNNTs in chemical vapour deposition (CVD) that is found to follow tip growth mechanism. Nanospherical having tail-like structures were produced in situ. Energy dispersive x-ray (EDX) analysis suggests these in situ generated nanoparticles are magnesium oxide which led us to propose the nucleation and growth of BNNTs. Magnesium played important roles; (1) generate the intermediate B species and (2) serve as a medium for BN species diffusion. The aim of my visit here at Institut de Química Computacional i Catàlisi is to have insights about the theoretical side of our synthesis mechanism. Thus, providing information to the limit of experimental techniques and explain the chemistry of the nucleation and growth of BNNTs.