Comments

Comments on the Transformation of Amorphous Boron Nitride to a Tubular Morphology

The recent publication in this journal of work by Shelimov and Moskovits,[1] describing a tubular morphology for boron nitride, prompts us to comment on their observations in light of our earlier published work in this area.[2,3] By way of background, our previous publications predate that of Shelimov and Moskovits and showed the first example of such a tubular structure for BN.[2,3] This earlier work illustrated formation of amorphous boron nitride from 2,4,6-trichloroborazine and alkali metals and its subsequent conversion to a turbostratic, tubular morphology through mass transfer to a corpuscular template. Our result is pertinent to this recent paper that describes a tubular morphology resulting from template-based CVD growth of BN, using a 2,4,6-trichloroborazine precursor.

Indeed, this recent work is entirely consistent with our earlier findings and our suggestion that the tubular morphology observed in our system resulted from in situ formation of corpuscular templates, which themselves arise from the collapse of initially formed hollow pseudospherical shells. The BN tubes observed by Shelimov and Moskovits are essentially identical to those described in our papers in terms of size, wall thickness, and apparent degree of crystallinity.

Our proposed growth mechanism,[2,3] however, would require relatively local migration of already formed amorphous boron nitride onto the template surface, rather than by deposition from the vapor phase. This migration is observed at temperatures as low as 1100 °C. These temperatures are significantly lower than those normally associated with any appreciable dissociation pressure or onset of sublimation of boron nitride,[4−7] which typically occur at temperatures in excess of 1900 °C. However, our mechanism is consistent with that subsequently proposed by Shelimov and Moskovits, as it requires growth by addition of new BN to the rim of the template rather than by hair-like growth from the root, which was recently reported for CVD growth of BN nanotubes on nickel boride catalyst particles.[8]

Acknowledgment. This work is based upon studies originally supported by the Army Research Office through Grant DAALO3-92-G-0199.

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Received January 9, 2001
Revised Manuscript Received February 12, 2001

CM012000J

10.1021/cm012000j
Published on Web 03/10/2001