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A Novel Opto-mechanical method for Mass Production of Hexagonal Boron Nitride in Water

Hexagonal boron nitride (hBN) is considered as most promising material for next generation microelectronic and other technologies. It can be easily integrated with other 2D materials such as graphene and molybdenum disulfide (MoS_2). The hBN has lattice constant like that of graphene and a large electrical band gap. Also, it has an atomically smooth surface and large optical phonon modes. These qualities make it applicable as a substrate material for a high-performance graphene electronics. Here, we report the large-scale synthesis of high quality 2D hBN nanosheets by a novel method based on liquid phase exfoliation. Water is being used as a solvent as it is an ideal dispersion medium due to its low cost and abundance. Here we exfoliate hBN directly in pure water without adding any chemical or surfactant. Ultra55 FE-SEM Karl Zeiss mono system was used to analyse the size of exfoliated hBN sheets. The images and the size distribution are shown in figure 1. Most of the flakes typically have the area in the range 0.5 μm^2 to 1.5μm^2. The number of layers were identified with atomic force microscopy (AFM) as well as Raman Spectroscopy.

References

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[2] K. Zhang, Y. Feng F. Wang, Z. Yang and J. Wang, J. Mater. Chem. C, 5 (2017) 11992-12022.
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Figures

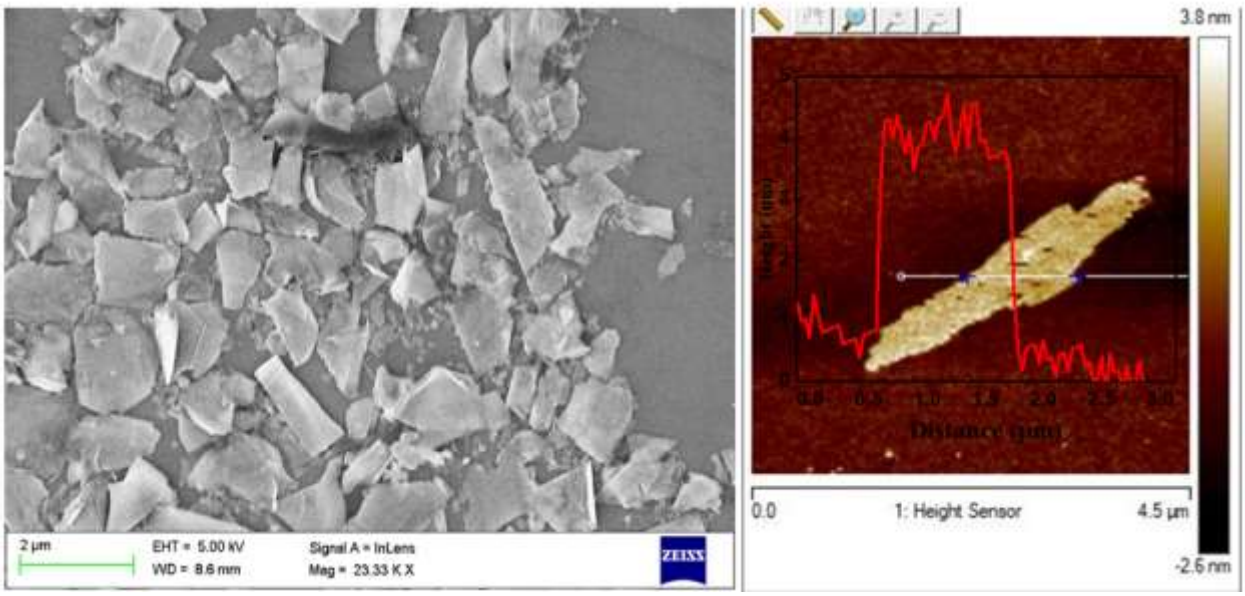

Figure 1: Sem image and AFM image of BNNs.