Contribution ID: **100** Type: **Poster Presentation**

Synthesis and CO gas sensing applications of two-dimensional hexagonal boron nitride nanosheets at different temperatures

Tuesday, 4 July 2023 15:56 (1 minute)

Abstract
Two-dimensional hexagonal boron nitride nanosheets were synthesised using the wet chemical reaction method. X-Ray Diffraction, Scanning Electron Microscopy, Transmission Electron Microscopy, Fourier Transform Infrared Spectroscopy, Raman Spectroscopy, UV-visible Spectroscopy and Brunauer-Emmett were used to attain the structural properties of the nanomaterials. Each spectroscopic technique affirmed unique features about the surface morphology of the nanosheets. The crystallinity of the nanosheets with the stacking of the B and N honeycomb lattice was validated by the X-ray diffraction. Scanning and transmission electron microscopy disclosed the surface morphology with the number of layers of a planar honeycomb BN sheet. Fourier transform infrared, Raman and UV-vis spectroscopies revealed the formation of the in plane and out of plane h-BN vibrations together with its optical properties. Surface properties were examined with the Brunauer-Emmett approach. The gas sensing application of the nanosheets was also tested on the carbon monoxide gas. 800℃ fabricated hexagonal boron nitride nanosheets demonstrated good sensitivity towards ppm of CO at 250℃.

Keywords: hexagonal boron nitride, chemical vapor deposition, nanosheets, toxic gases, sensitivity, response.

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Yes

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PhD

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Session Classification: Poster Session 1

Track Classification: Track A - Physics of Condensed Matter and Materials