

August 11-14th at the Crowne Plaza Hotel in downtown Knoxville, TN



Contribution ID: 70

Type: **Poster Only**

Vibration Spectroscopy and Nanodiffraction of Multi-phase Boron Nitride Thin Films.

Vibration Spectroscopy and Nanodiffraction of Multi-phase Boron Nitride Thin Films.

Nooreen Qureshi & Kory Burns

Department of Materials Science and Engineering, University of Virginia, USA

Epitaxial growth of cubic boron nitride (c-BN) thin films on diamond is a holy grail for high-power electronics as it can efficiently dissipate heat due to its high thermal conductivity. Therefore, extensive efforts are ongoing to grow epitaxial c-BN thin films on diamonds with an atomically smooth interface. Over the course of this study, the early-stage epitaxial growth of few-layer c-BN films on nitrogen functionalized (001) single crystal diamond surface was observed with atomic-scale interpretation. Specifically, the existence of these layers was verified with advanced transmission electron microscopy (TEM) methods, highlighted by monochromated electron energy loss spectroscopy (EELS) to probe phonon transport at strain-driven interfaces and scanning nanodiffraction 4D scanning TEM (4D-STEM) to measure impurity scattering at a localized scale. Ultimately, this work presents a new materials platform for potential applications in next-generation quantum sensors for pressure water reactors, owing to its isotropic thermal properties and supreme radiation hardness.

Topical Area

Hard matter: quantum, electronic, semiconducting materials

Author: QURESHI, Nooreen (University of Virginia)

Co-author: Dr BURNS, Kory (University of Virginia)

Presenter: QURESHI, Nooreen (University of Virginia)