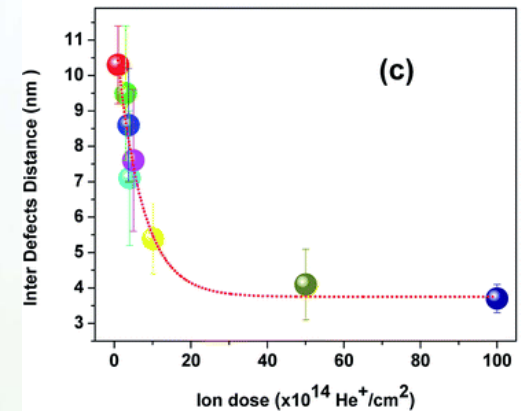
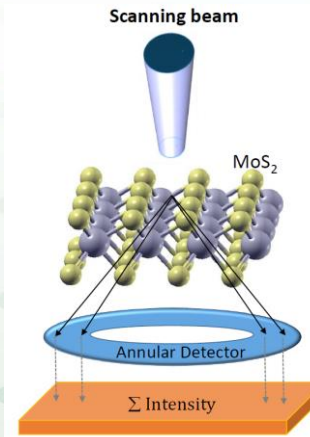
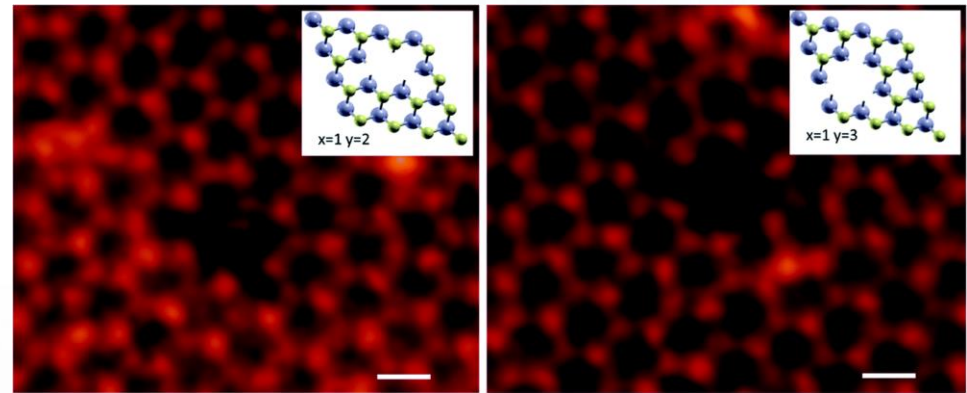


Quantification of defects engineered in single layer MoS₂

Frederick Aryeetey (NCA&T), Tetyana Ignatova (UNCG), Shyam Aravamudhan (NCA&T)

Atomic defects are controllably introduced in suspended single layer molybdenum disulfide (1L MoS₂) using helium ion beam. Vacancies exhibit one missing atom of molybdenum and a few atoms of sulfur. Quantification was done using a Scanning Transmission Electron Microscope (STEM) with an annular detector. Experimentally accessible inter-defect distance was employed to measure the degree of crystallinity in 1L MoS₂. Correlation between the appearance of an acoustic phonon mode in the Raman spectra and the inter-defect distance was established, which introduces a new methodology for quantifying defects in 2D materials.



Published in RSC Adv., 2020, 10, 22996.

Part of the work supported by NSF ECCS-1542174 and Center for Nanophase Materials Sciences, which is a DOE Office of Science User Facility