Research description: In recent years, aberration-corrected scanning transmission electron microscopy (STEM) has progressed into the field of material modification. NRL researchers are working to understand how to harness electron beam–matter interactions to engineer nanoscale and sub-nanoscale features to develop materials for implementation in nanoelectronic devices and scalable quantum technologies. Example projects include characterization and manipulation of single-atom defects in diamond and electron-beam-induced 2H-to-1T phase transformations in transition metal dichalcogenides. Much of the work will be performed using NRL's world-class facilities for nanoscale analytical TEM research, including a Nion UltraSTEM-200X aberration-corrected STEM with electron energy loss spectroscopy (EELS) with direct-electron detection, energy dispersive X-ray spectroscopy (EDS), and in situ biasing and electrochemical holders. Supporting instruments include a FEI Helios G3 FIB-SEM, Cameca atom probe, and several ALD systems.

References:

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