

## "Atomic structure-properties study of defects in emerging 2D materials" Prof. Junhao Lin

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Two-dimensional (2D) materials are considered to be the candidates for future nano-electronic, optoelectronic and spintronics applications. It is well known that defects are determinant to the properties of materials, thus understanding defects in 2D materials serves as the key step for functionality engineering and improved performance in devices. In this talk, I will first show the atomic scale structure-properties correlation studies of various defect structures in emerging 2D materials, by quantitative intensity analysis in a low-voltage scanning transmission electron microscope (STEM). Secondly, I will introduce the universal strategy to over the structural degradation problem of airsensitive 2D materials. We develop a home-built interconnected inert gas protection system compatible with atomic STEM imaging, and I will show the recent breakthroughs in structure-properties correlation of various air-sensitive 2D materials. Examples including but not limit to: monolayer amorphous carbon where the high-density distorted defect network contribute to its ultrahigh mechanical toughness; intrinsic defect structures in air-sensitive WTe<sub>2</sub>/MoTe<sub>2</sub> monolayer and their heterostructures with resonating phonon vibrations; superlattice reconstruction in dative epitaxial heterostructure and self-intercalated 2D magnetic heterojunction with exotic magnetic responses, etc.

Main meeting room at Institute of Engineering Innovation 工学部総合研究機構9号館1階 大会議室 2023 Aug 23<sup>rd</sup> (Wed) 15:30~16:30