

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING

Website: <https://cde.nus.edu.sg/ece>

Area: Microelectronic Technologies and Devices (MTD)

Host: Assoc Prof Zhu Chunxiang

TOPIC	:	Direct Visualization of Intrinsic Trimer-Vacancy Defects in Elemental Tellurium
SPEAKER	:	Mr Wang Zhiyong Graduate Student, ECE Dept, NUS
DATE	:	Monday, 27 October 2025
TIME	:	10:00AM to 11:00AM
VENUE	:	Join Zoom Meeting https://nus-sg.zoom.us/j/85315670642?pwd=Wgal7WmU55XinSAOqsqynX0jJzUdLN.1 Meeting ID: 853 1567 0642 Passcode: 132003

ABSTRACT

Unveiling atomic defects on a two-dimensional (2D) material is of great industrial and academic interest from the viewpoint of developing next-generation electronics and optoelectronics based on 2D materials. As the most chemically tractable case, graphene and related elemental 2D materials have attracted increasing attention in recent years. However, defect studies on elemental 2D materials beyond graphene remain largely unexplored and are still in their infancy. Here we report the epitaxial growth of elemental tellurium (Te) mono- and bilayer on Au(100) with a typical helical chain structure. It has been found that Te₃ trimer acts as the atomic Lego to form the helical chain during the epitaxy process. Scanning tunneling microscopy (STM), along with simulation results, unveils that intrinsic defects in Te films are composed of trimer vacancies (V_{trimer}). Point spectroscopy and spatially resolved dI/dV mapping show that these intrinsic defects in elemental Te films possess many unoccupied states, which can act as electron traps, and exhibit bias-dependent orbital distributions. Furthermore, the freestanding Te film with intrinsic trimer-vacancy defects exhibits excellent environmental stability. Our findings elucidate the structural and electronic properties of intrinsic defects in Te mono- and bilayers, offering new insights into atomic defects in 2D materials, where a wealth of exotic physical and chemical properties awaits exploration.

BIOGRAPHY

Mr. Zhiyong Wang is a dedicated researcher specializing in flexible electronics, holding a master's degree in natural science of chemistry from University of Science and Technology of China (USTC). Currently pursuing a Ph.D. at the National University of Singapore (NUS) under Associate Professor Zhu Chunxiang, Zhiyong's research interests include surface and interface science, 2D Materials growth and atomic characterization, and nanocatalysis.

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