

Chemical Vapor Deposition Growth of TMDCs with Ultralow Density of Defects



18 November 2025

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Venue: N23-4018
Time: 14:00 - 15:00
Hosted by: Prof. Shen LAI

Abstract

Two-dimensional semiconductors represented by transition metal chalcogenides (TMDCs) have attracted much attention due to their unique electrical and optical properties at atomic thickness. As the dimensions decrease from three to two dimensions, inevitable defects in materials significantly affect their performance. A thorough understanding of the formation mechanism of defects and the controllable preparation of two-dimensional semiconductors with low defect density are key to promoting the application of high-performance electronic and optoelectronic devices. In this lecture, we focus on the formation of point defects in two-dimensional semiconductors and their impact on material properties, and compare the two main defect characterization technologies, spectroscopic measurement and direct imaging. Further, we focus on exploring the growth mechanism of solid-state recondensation sulfur method and iodine-assisted method in preparing high-quality, low-defect density TMDCs. Finally, the opportunities and challenges in the field of defect identification and control of two-dimensional semiconductors are summarized, and the future development direction is prospected.

Biography

Prof. Qinke WU is an Associate Professor at Hubei University of Technology. He is mainly engaged in the synthesis and property research of advanced two-dimensional materials. He uses chemical vapor deposition and other methods to synthesize two-dimensional materials such as graphene for applications in electricity, mechanics, optics and catalysis. He has published more than 30 papers in Journal of American Society, Advanced Materials, Advanced Functional Materials, Angewandte Chemie International Edition and other magazines. Authorized two Chinese patents and three US patents and served as a reviewer for Solid Thin Films, Small Methods and other magazines.