

# Structural and Optical Properties of Chalcogenide WS<sub>2</sub> Thin Film



Avneesh Kumar, Sandeep Kumar, Mudit Prakash Srivastava, Prachi Yadav, Surbhi, and Devendra Kumar Rana

## 1 Introduction

The transition metal dichalcogenide compounds are found very useful in a wide range of applications these days [1]. Among the known 2D transition metal dichalcogenides, the tungsten disulphide (WS<sub>2</sub>) material possesses high electron mobility owing to the decreased effective mass of electrons in WS<sub>2</sub> [2]. WS<sub>2</sub> exhibits a layered structure. The molecules in the layers of WS<sub>2</sub> are held together by weak van der Waals interactions within each layer of WS<sub>2</sub>, there are strong covalent bonds between tungsten and sulfur atoms. The covalent bonds hold the atoms together within each layer, forming a hexagonal lattice [3]. Due to low toxicity, WS<sub>2</sub> can be used safely in a variety of applications including optoelectronic and light-sensing devices [4]. Thin films of WS<sub>2</sub> possess a polycrystalline structure with a hexagonal phase. The WS<sub>2</sub> structure consists of three layers, with a tungsten (W) layer sandwiched between two Sulphur (S) layers. The widely studied transition metal

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A. Kumar · M. P. Srivastava

Department of Physics, SRM Institute of Science and Technology, Delhi, NCR Campus  
Modinagar, Ghaziabad 221005, India

S. Kumar

Department of Physics, Bhaskaracharya College of Applied Sciences, University of Delhi,  
Delhi 110075, India

P. Yadav

Department of Physics, Kirori Mal College, University of Delhi, New Delhi 110007, India

Surbhi

Department of Applied Physics, Amity Institute of Applied Science (AIAS), Amity University,  
Noida Sector 125, Noida 201313, India

D. K. Rana (✉)

Material Science Research Lab (Theory and Experiment), Department of Physics, ARSD College,  
University of Delhi, New Delhi 110021, India  
e-mail: [drana@arsd.du.ac.in](mailto:drana@arsd.du.ac.in)