INVITED SPEAKER

Id-962

Substrate-Induced Strain in Molybdenum Disulfide Thin Films Grown by Aerosol-Assisted Chemical Vapour Deposition

L. J. ADAMS, J. M. MORBEC, P. D. MATTHEWS, N. BALAKRISHNAN*

School of Chemical and Physical Sciences, Keele University, ST5 5BG, United Kingdom

* Corresponding author: n.balakrishnan@keele.ac.uk

Abstract. Transition metal dichalcogenides have been extensively studied in recent years because of their fascinating optical, electrical, and catalytic properties. However, low-cost, scalable production remains a challenge. Aerosol-assisted chemical vapour deposition (AACVD) provides a new method for scalable thin film growth. In this study, we demonstrate the growth of molybdenum disulfide (MoS_2) thin films using AACVD method. This method proves its suitability for low-temperature growth of MoS_2 thin films on various substrates, including glass, silicon dioxide, quartz, silicon, hexagonal boron nitride, and highly ordered pyrolytic graphite. The as-grown MoS_2 shows evidence of substrate-induced strain [1]. The type of strain and the morphology of the as-grown MoS_2 highly depend on the growth substrate's surface roughness, crystallinity, and chemical reactivity. Moreover, the as-grown MoS_2 shows the presence of both direct and indirect band gaps, suitable for exploitation in future electronics and optoelectronics.

Keywords: Molybdenum Disulfide; Transition Metal Dichalcogenides; Thin Films; Aerosol-Assisted Chemical Vapor Deposition; Strain.

Keywords: Molybdenum Disulfide; Transition Metal Dichalcogenides; Thin Films; Aerosol-Assisted Chemical Vapor Deposition; Strain.

REFERENCES

[1] L. J. Adams, P. D. Matthews, J. M. Morbec, N. Balakrishnan, Substrate-induced strain in molybdenum disulfide grown by aerosol-assisted chemical vapor deposition, Nanotechnology, 35, 395602 (2024).