

# Optical behavior of pristine and intercalated-(Mn) bilayer MoS<sub>2</sub> for optical storage applications

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Abstract

**This work** highlights the optical behavior of pristine and intercalated bilayer (Mn)-MoS<sub>2</sub> and its application in the field of optical storage. The optical behavior is estimated by the study of absorption (index and coefficient, Fig.1 (a, b)), dielectric constant (imaginary ( $\epsilon_2$ ) Fig.1(c)), refractive and reflective index (Fig.1(d, e)) followed by band structure study (Fig. 1(f)). The peaks of absorption spectrum are related with the optical storage of the pristine and intercalated-(Mn) bilayer MoS<sub>2</sub>. The pristine bilayer MoS<sub>2</sub> shows high absorption peaks in the visible while intercalated-(Mn) MoS<sub>2</sub> in the infrared (IR) region. The sharp peaks acts as a source of photogenerated trapping centers on the 'Mo' and 'Mn'-atom and is of use in optical memory devices. Another important parameter is optical conductivity ( $\sigma(\omega)$ , Fig.1(g)) which shows increased photo-responsivity to assist the performance of light-controlled memory devices as novelty of the present study. The reported works have not attempted to analyse the memory application and limited to material DFT study.

References

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Figures

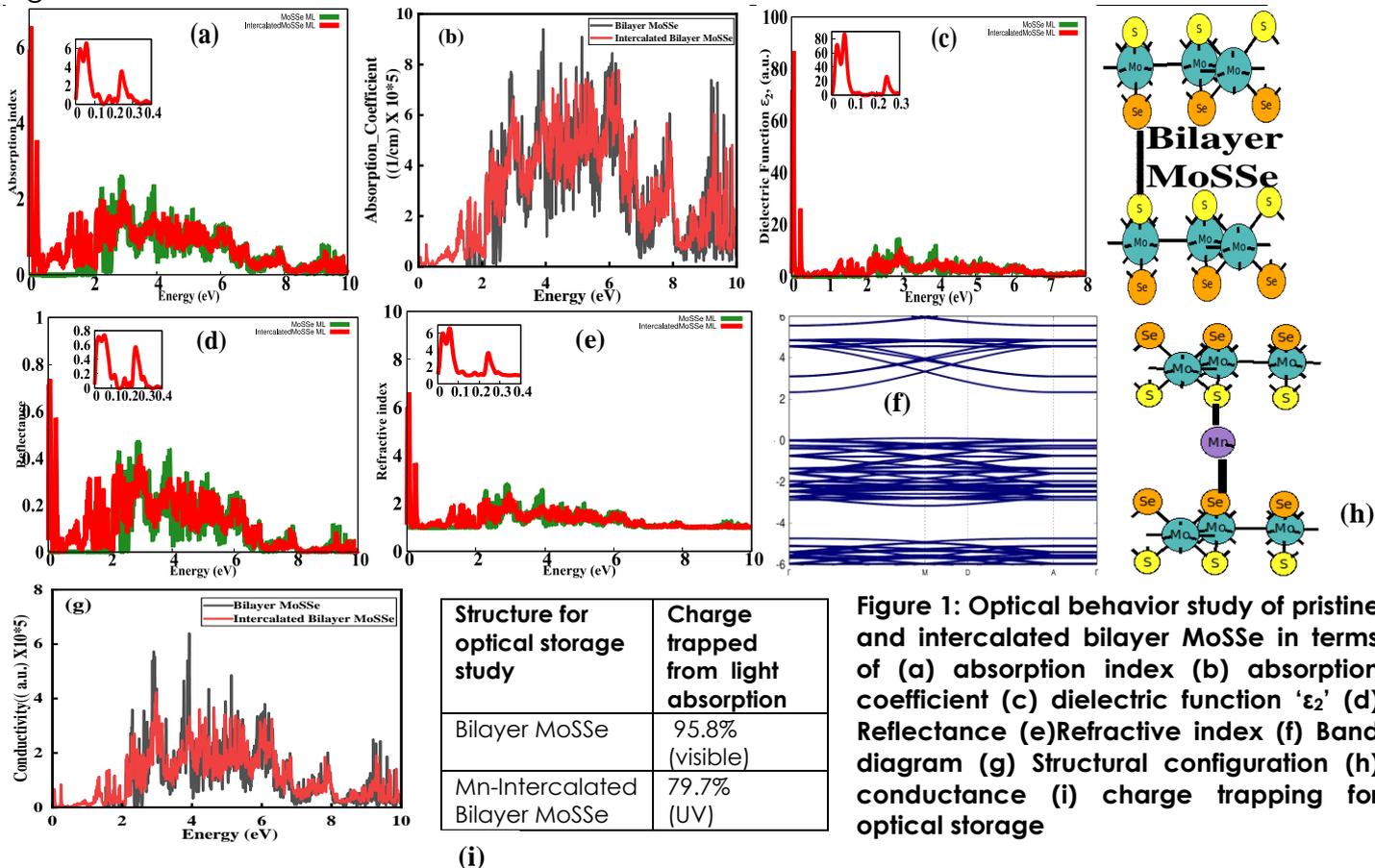


Figure 1: Optical behavior study of pristine and intercalated bilayer MoS<sub>2</sub> in terms of (a) absorption index (b) absorption coefficient (c) dielectric function ' $\epsilon_2$ ' (d) Reflectance (e) Refractive index (f) Band diagram (g) Structural configuration (h) conductance (i) charge trapping for optical storage