

Layered perovskites and chalcogen semiconductor materials for solar cell applications

Neelam Venkata Phani Chandra

Indian Institute of Technology Madras (IITM), Department of Chemical Engineering, Chennai, India.

Mail: ch17d003@smail.iitm.ac.in

contact: 7395992824

Layered semiconducting materials have gained attention because of their remarkable property of tuneable bandgap and also excellent stability in the ambient conditions. 2D perovskites and transition metal di-chalcogenides (TMDs) comes under this category. The photo absorption and emission properties of a dimensional perovskite vary with the number of octahedral layers where with the increase in octahedral layers, the bandgap of the material decreases because of which there will be an increase in photo absorption. Utilizing these properties, these materials were used in photovoltaics application. My work demonstrates the fabrication of a single junction solar cell with layered materials as photo absorbers. solar Along with the applications, research on fundamental properties like photoluminescence, life time, and absorption were carried out.

REFERENCES

- [1] Zeng, Longhui, Yang Liu, Shenghuang Lin, Wayesh Qarony, Lili Tao, Yang Chai, Xuming Zhang, Shu Ping Lau, and Yuen Hong Tsang, *Solar Energy Materials and Solar Cells*, (2018) 174.
- [2] Aut Stoumpos, Constantinos C., Chan Myae Myae Soe, Hsinhan Tsai, Wanyi Nie, Jean-Christophe Blancon, Duyen H. Cao, Fangze Liu et al, *Chem 2*, (2017) 427-440.
- [3] Cao, D. H., Stoumpos, C. C., Farha, O. K., Hupp, J. T., & Kanatzidis, M. G., *Journal of the American Chemical Society*, (2015), 7843-7850.

FIGURES

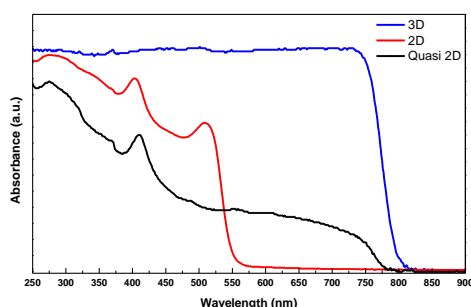


Figure 1: Absorption spectra of layered perovskites



Figure 2: Picture of fabricated solar cell device