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Name of the Scholar: Hasan Abbas

Name of the Supervisor: Prof. Zishan Husain Khan

Name of the Department/Centre: Applied Sciences and Humanities

Topic of Research: Study of Perovskite based materials

Findings

In the present thesis work, simple, easy, and cost-effective methods were developed to synthesize/fabricate different 2D materials like ZnS nanorods, ZnSe nanoparticles, TiS_2 nanosheets, and perovskite materials. Furthermore, various perovskite composites with 2D materials (concentration; 0, 2, 4, and 6 mg/ml) were prepared. Moreover, these 2D materials and perovskite (composite) materials were deployed in the fabrication of efficient and stable solar cells. As-synthesized materials were characterized with the help of XRD, UV-Visible spectroscopy, Photoluminescence Spectroscopy, Time-resolved Photoluminescence Spectroscopy, Contact angle Analysis, and Scanning Electron Microscopy. Furthermore, as-fabricated solar cells were analyzed using PET Solar Simulator and, Keithley sourcemeter. Results based on present thesis have clearly shown the surface optimization of perovskite materials and pave the way towards large scale/commercial production of perovskite solar cells.