

## Earth-abundant Chalcogenide Nanomaterials for Photovoltaic Applications

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The interest on clean energy demands the development of eco-friendly and cost-effective processes and materials with novel features to convert maximum energy from the sun. Earth-abundant semiconductor nanoparticles provide the efficient collection of radiation and generation of electrons. We present the synthesis, properties, and photovoltaic abilities of earth-abundant Fe(S,Se)<sub>2</sub>, Sn(S,Se), Sb<sub>2</sub>(S,Se)<sub>3</sub>, Cu<sub>2</sub>Sn(S,Se)<sub>3</sub>, CuSb(S,Se)<sub>2</sub>, and Cu<sub>2</sub>ZnSn(S,Se)<sub>4</sub> nanoparticles. First, the overview on the nanoparticle synthesis techniques and synthesis of earth-abundant nanoparticle and their properties are provided. Next, the nanoparticle ink preparation, coating, and fabrication steps of devices are described.