Special Issue

Advanced Quantum Dot Intermediate Band Solar Cells

Message from the Guest Editor

The intermediate band solar cell (IBSC) aims to overcome this problem by (1) generating a higher current (thanks to the extra, two-step absorption of sub-bandgap photons via a half-filled, electrically isolated intermediate band (IB) located within the semiconductor gap), which is injected (2) at a high voltage (limited by the bandgap and not by any of the two sub-gaps the IB divides it). Quantum dots (QDs) are one of the approaches used to implement the IBSC concept. They are nanostructures in which carriers are confined to the three spatial directions and exhibit discrete energy levels separated from the conduction and valence bands by gaps with zero-density of states. A dense array of QDs makes the energy levels become an IB. This approach, called quantum dot intermediate band solar cell (QD-IBSC), has been recently used to experimentally prove, at room temperature, the physical principles (1) and (2) the operation that IBSC is based on.

Guest Editor

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