Indium Arsenide (InAs) Quantum Dots for applications in Intermediate Band Solar Cells (IBSC)

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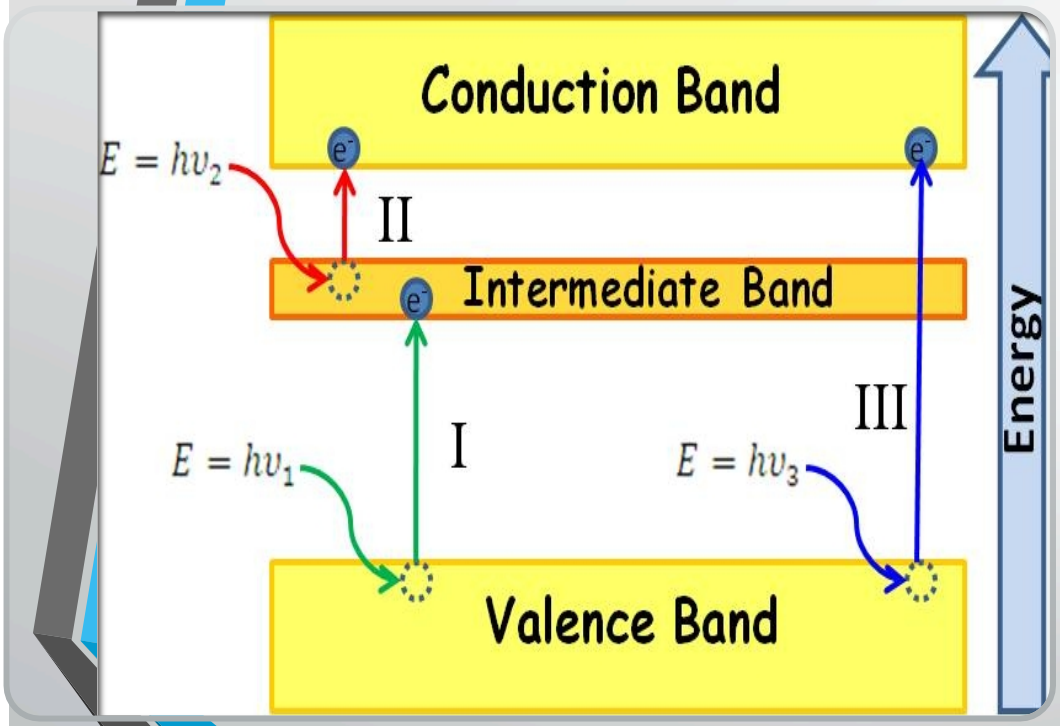
What's the Intermediate Band (IB)?



- An Energy level Between the Valence Band (VB) and Conduction Band (CB)
- Existence of IB absorbs photons with energies smaller than the semiconductor bandgap.
- Increase in Efficiency greater than the Shockley-Quessier Limit
- Problem….They are hard to make

How we make our Intermediate bands

- Currently 3 different methods
- We use self assembled Quantum Dot Structures
- Most well investigated Quantum Dot system is Indium Arsenide/ Gallium Arsenide.

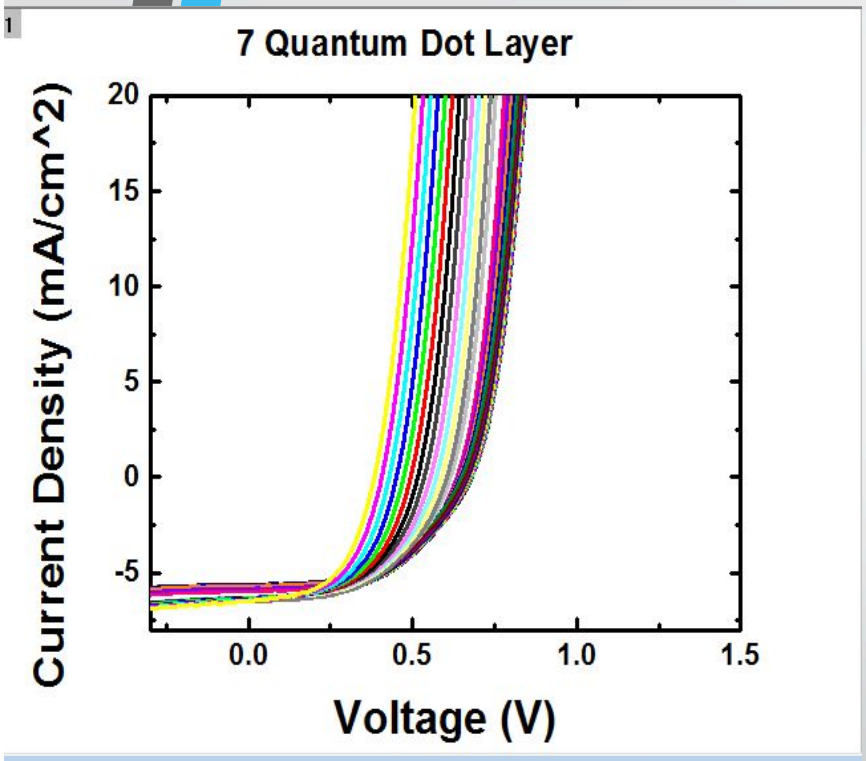
Quantum Dots (QD)

- Nanoscale semiconducting material
- Many QD will emit light of specific frequencies when exposed to electricity or light

Quantum Dots

- There are some drawbacks with the InAs/GaAs QD system
- $InAs/GaAs_{1-x}Sb_x$ Is a promising candidate for IBSC applications
- Can fabricate devices with higher efficiencies
- QD systems grown by Molecular Beam Epitaxy (MBE)

My Research



- Extract information about the transport properties of different cell samples
- Taking I-V measurements at varying Temperatures
- Take EQE measurements at different Temperatures