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Topic of Research: **Synthesis and Characterization of Organic Semiconductor Nanostructures for Optoelectronic Devices**

The research work undertaken in my thesis involves the **Synthesis and Characterization of Organic Semiconductor Nanostructures for Optoelectronic Devices**. I have synthesized nanowires of a popular organic semiconductor Alq3 doped with different metals and studied their physical properties. Ag incorporated Alq3 nanowires were synthesized using ultrasonic incorporation and thermal vapor transport method. These nanowires showed a 4-fold enhancement in PL efficiency in comparison to pristine Alq3 nanowires. Zn doped Alq3 nanowires were also synthesized using the same method and showed excellent characteristics. Erbium (Er) was doped in Alq3 using the co-evaporation method. The Erbium doped Alq3 powders were synthesized using the thermal vapor transport method. Enhancement in PL intensity was also observed for Erbium-doped Alq3 nanowires. Platinum (Pt) was also incorporated in Alq3 nanowires using the ultrasonic incorporation method. Pt incorporated Alq3 nanowires showed considerable PL quenching. Enhancement in carrier transport properties was also observed in Pt incorporated Alq3 nanowires. Pt incorporated Alq3 nanowires were used in cathode interfacial layer of solar cells made up of perovskite-ZnO photoactive layer.

Incorporation of Alq3:Pt cathode interfacial layer resulted in the enhancement of the Photon Conversion Efficiency (PCE) and stability of solar cells.