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Optical and Electrical Characterization of Quantum Dots Decorated ZnO Nanowires for Energy Conversion[1] RICHARD MU, ANTHONY MAYO, Fisk University, HAIYANG XU, YICHUN LIU, Northeast Normal University — Significant progress has been made recently in understanding optoelectronic properties of metallic and semiconducting quantum dots and their interactions with their surrounding nano-environments. It is shown that nanostructured photovoltaic devices do have clear advantages over the bulk counterparts to address energy challenges facing humanity. They require much less mass, not exclusively limited by materials of choice, and favoring integration for multifunctionality to be able to effectively harvest solar energy by tuning the optical gap and enhancing photon absorption across section through various nanomaterials syntheses. The other challenge is to be able to purposely control and manipulate the energy transfer pathways for particular needs. As for nanostructured photovotaic devices, charge and exciton transports must be carefully evaluated. The knowledge of charge and exciton mobility, coherent and incoherent hopping due to electronic coupling, energy redistribution and partition in may be the critical steps. CdTe and Si functionalized bare ZnO nanowires, and core/shell have been fabricated with Glazing Angle Deposition technique as the model systems. A series materials characterization techniques (confocal Raman, optical, photoluminancence and electrical) have been conducted to provide valuable information about the nanostructure. Results will be presented and discussed along with their scientific implications.

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