Synthesis and Photovoltaic Effect of CdSe/ZnTe Core/Shell Nanowire

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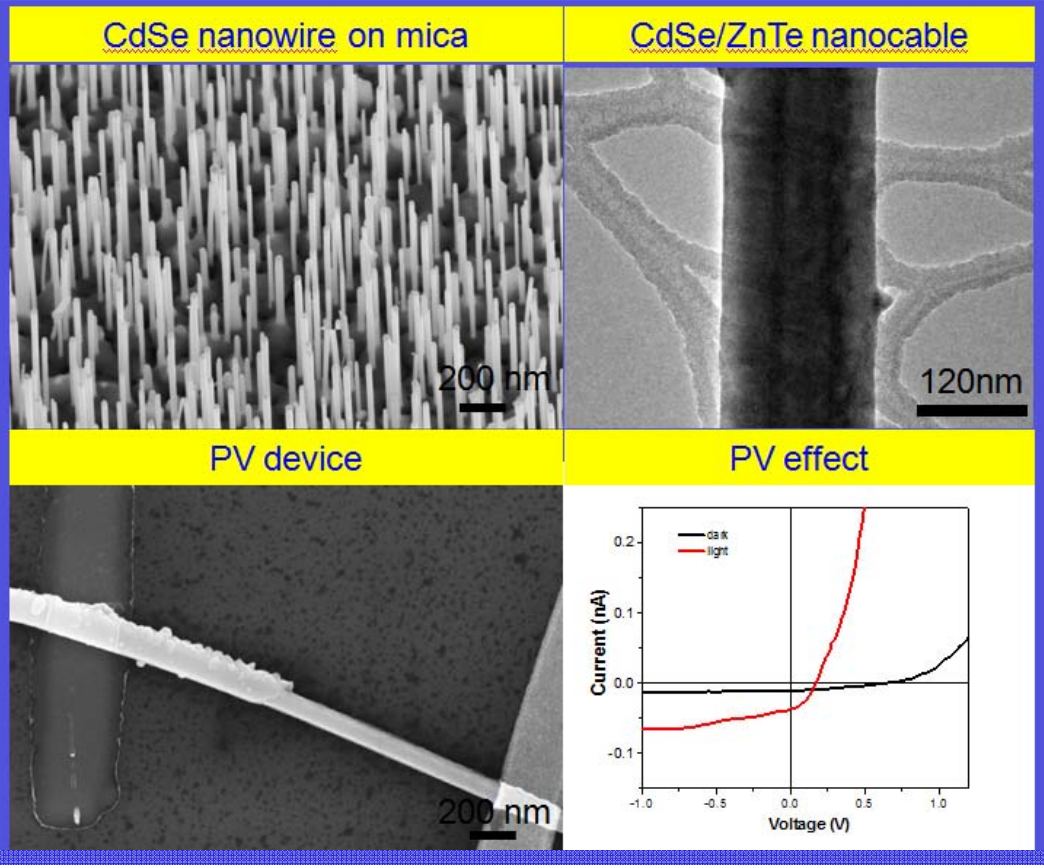
Background & Motivation In our last report, we have synthesized well-aligned ZnO/ZnS core/shell nanowire array and demonstrated a photovoltaic device, despite the relatively low calculated efficiency of ~0.1%. The inefficient conversion efficiency majorly originated from the poor absorption profiles and the server interface recombination because of the large lattice mismatch. In light of this, we tried to explore a new semiconducting combination, CdSe and ZnTe, with better interface and proper absorption profiles.



Progress

Herein, we report the synthesis, structure analysis and the photovoltaic effect of CdSe/ZnTe core/shell nanowire arrays. A two-step synthesis method combining thermal evaporation and pulsed laser deposition was applied to realize the core growth and shell coating. The photocurrent increase/drop instantly with on/off of the solar light exposure to the single nanocable device. Despite the relatively weak photocurrent generated, we observed the obvious photovoltaic effect, which is similar to that observed in the solar cell based on single coaxial silicon nanowire. Further work including optimization of the materials electrical properties by doping and the etching process are undergoing.