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Photosensitization of ZnO nanowires via pulsed electron beam deposition of CdTe quantum dots.¹ ROBERTO AGA, DAWIT JOWHAR, AKIRA UEDA, ZHENGDA PAN, RICHARD MU, Fisk University — We demonstrate the photosensitization effect of CdTe quantum dots (QDs) on ZnO nanowires (ZnO-NWs). The QDs are directly deposited on a network of ZnO-NWs grown on glass substrate via pulsed electron beam deposition technique under 17 millitorr argon background gas pressure. The ablation parameters that we employ result to an average deposition rate of 0.06 nm/pulse. CdTe deposition with 25 pulses increases the photocurrent at 2V-bias of the ZnO-NWs by an order of magnitude under sub-bandgap illumination. Before photosensitization, the ZnO-NWs already exhibit weak sub-bandgap photoconductivity due to the presence of defect states between the bandgap. The enhancement in photoconductivity that resulted from the deposition of QDs, which can absorb photons with wavelengths up to 800 nm, is attributed to the efficient transfer of photo-excited electrons from the conduction band of CdTe towards the conduction band of ZnO.

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