

Abstract Submitted  
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**Ultrafast Hole Transfer From CdSe Quantum Dots to Nitroxide Free Radicals**<sup>1</sup> MERSEDEH SANIEPAY, POULAMI DUTTA, YANHAO TANG, CHENJIA MI, Michigan State University, KYLE DISSELKOEN, Calvin College, JOHN MCGUIRE, REMI BEAULAC, Michigan State University, MCGUIRE COLLABORATION, BEAULAC COLLABORATION — Organic molecules coupled to inorganic semiconductor quantum dots (QDs) have been proposed to be interesting candidates for photocatalytic applications. Among these molecules, nitroxide free radicals are proven to be efficient photoluminescence (PL) quenchers when coupled with II-IV QDs but the mechanism of this PL quenching has not been well-understood. Here, we assessed the mechanism of the PL quenching of photoinduced colloidal CdSe QDs by 4-Amino, 2,2,6,6-tetramethylpiperidine-1-oxyl radical (4-Amino-TEMPO). Analysis of the time-resolved photoluminescence and transient absorption spectroscopies show a hole transfer from the valence band of CdSe QDs to 4-Amino-TEMPO. This reductive quenching happens in sub-picosecond timescale. Such ultrafast hole extraction of colloidal CdSe QDs by 4-Amino-TEMPO implies that these radicals are efficient hole acceptors when coupled directly to CdSe QDs, therefore suggesting CdSe QDs/ Nitroxide free radicals hybrid systems can play a significant role in the future of optoelectronic applications.

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