# Photostability of CdSe Quantum Dots Functionalized with Aromatic Dithiocarbamate Ligands\_2013

Organic ligands are widely used to enhance the ability of CdSe quantum dots (QDs) to resist photodegradation processes such as photo-oxidation. Because long alkyl chains may adversely affect the performance of QD devices that require fast and efficient charge transfer, shorter aromatic ligands are of increasing interest. In this work, we characterize the formation of phenyl dithiocarbamate (DTC) adducts on CdSe surfaces and the relative effectiveness of different para-substituted phenyl dithiocarbamates to enhance the aqueous photostability of CdSe QDs on TiO2. Optical absorption and photoluminescence measurements show that phenyl DTC ligands can be highly effective at reducing QD photocorrosion in water, and that ligands bearing electron-donating substituents are the most effective. A comparison of the QD photostability resulting from use of ligands bearing DTC versus thiol surface-binding groups shows that the DTC group provides greater QD photostability. Density functional calculations with natural bond order analysis show that the effectiveness of substituted phenyl DTC results from the ability of these ligands to remove positive charge away from the CdSe and to delocalize positive charge on the ligand.

# Postsynthesis Phase Transformation for CsPbBr3/Rb4PbBr6 Core/Shell Nanocrystals with Exceptional Photostability\_2018

Lead halide perovskite nanocrystals (NCs) as promising optoelectronic materials are intensively researched. However, instability is one of the biggest challenges needed to overcome before fulfill their practical applications. To improve their stability, we present a postsynthetic controlled phase transformation of CsPbBr3 toward CsPbBr3/Rb4PbBr6 core/shell structure triggered by rubidium oleate treatment. The resulting core/shell NCs show exceptional photostability both in solution and on-chip. The solution of CsPbBr3/Rb4PbBr6 NCs can remain over 90% of the initial emission photoluminescence quantum yields after 42 h of intense light-emitting diodes illumination (450 nm, 175 mW/cm2), which is even better than the conventional CdSe/CdS quantum dots whose emission drop to 50% after 18 h under the same condition. We believe that the exceptional photostability should be resulted from the protection of the robust Rb4PbBr6 shell on CsPbBr3 NCs.