

Understanding Stability of All-Inorganic Colloidal Cesium Lead Halide Perovskite Nanocrystals

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During the past years, all-inorganic colloidal cesium lead halide perovskite nanocrystals (CsPbX<sub>3</sub> NCs) have received huge interest because of high photoluminescence efficiency and unprecedented color purity. However, further development of the CsPbX<sub>3</sub> NCs was considerably hampered because the NCs are very unstable when they are stored under ambient conditions. In order to overcome the serious instability issue, new synthesis introducing additional metal halides was developed. Enhancement of stability was striking by the the new synthesis, but the role of additional metal halides was still in veil. Here, we demonstrate the role of additional metal halide for the enhanced stability of CsPbX<sub>3</sub> NCs. We reveal surface ligand transition from anionic oleate to cationic oleylammonium passivation by the presence of additional metal halides during the synthesis. As a result, formation of structurally-vulnerable (110) surfaces is disturbed.