# Atomic precision synthesis and characterization of perovskite quantum dots for blue light emitting diodes

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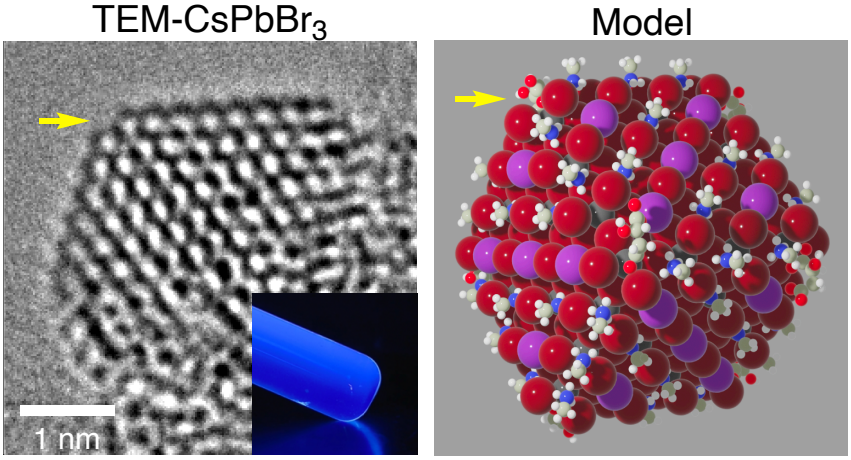
When a semiconducting material becomes smaller and smaller, quantum confinement appears which dramatically affects the bandgap of the material[1,2]. Since surface effects become predominant, understanding the size distribution and surface chemistry within the sample becomes critical.

In this work, we use polycarboxylates to synthesize ultrapure small (2.5 nm) perovskite quantum dots with blue emission. We focus on characterizing the species synthesized and its surface chemistry such as the ligands' number, binding modes and position on the surface of the dot by using modelling and atomic-resolution electron microscopy. We found out that in ultrasmall quantum dots, carboxylates are bound solely to the corner lead atoms while ammonium ligands are distributed on the entire surface. We then use this material in light emitting diodes resulting in ultrapure blue electroluminescence suitable for display applications.

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