

Solvent-Free Synthesis and Deposition of Cesium Copper Halides with Bright Blue Photoluminescence

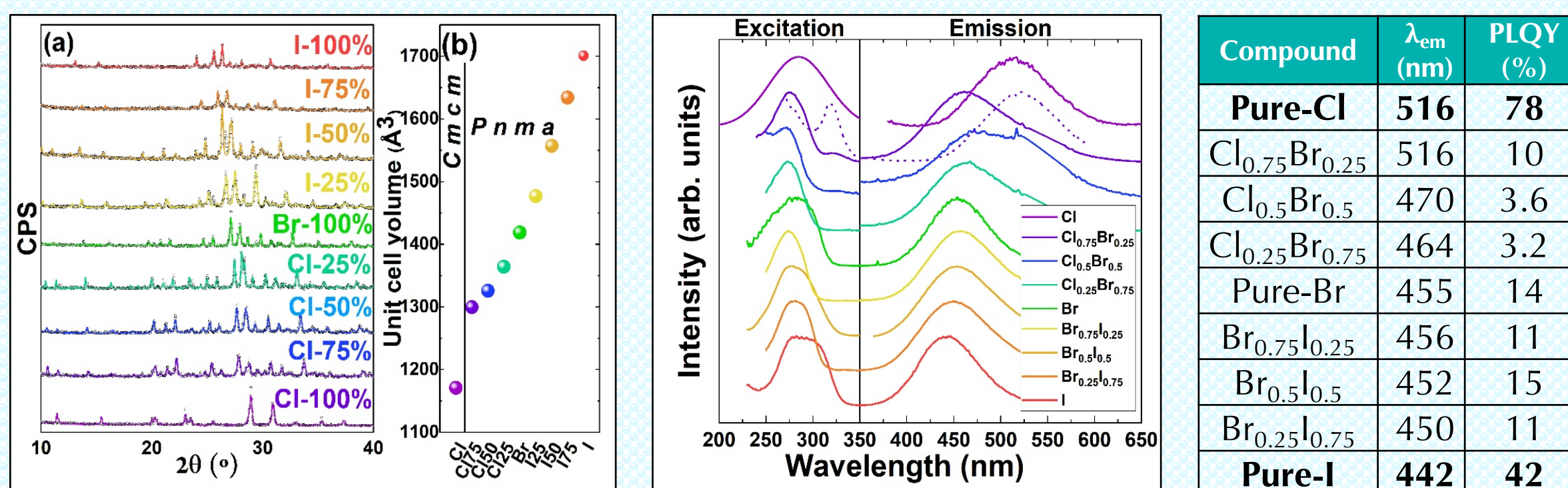
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Introduction

Cu(I)-based fully inorganic ternary metal halides are particularly promising in the search of new **lead-free materials**, especially for applications in light-emitting diodes (LEDs). We report the **dry mechanochemical synthesis** of a series inorganic cesium copper halides, with the formula $\text{Cs}_3\text{Cu}_2\text{X}_5$ (X = Cl, Br, I, and mixtures thereof). $\text{Cs}_3\text{Cu}_2\text{I}_5$ has been identified as the most promising material, as it maintains **blue luminescence** with photoluminescence quantum yield exceeding **40%** even after being deposited in **thin-film** by single-source vacuum deposition (SSVD).

Characterization



SSVD thin-films of $\text{Cs}_3\text{Cu}_2\text{I}_5$ are **highly homogeneous** and keep the blue PL and PLE spectra of the powders, with a **PLQY of 29%**.

Conclusions

- Easily synthesized by **green methods**
- Emission tuned in the **blue-green region**
- **High luminescent** properties for LEDs
- Deposition in **thin-film** by SSVD, maintaining optical features

Supporting information

- *Chem. Mater.* **2019**, *31*, 24, 10205-10210
- *J. Mater. Chem. C*, **2019**, *7*, 11406-11410