Centrifugal Coated Quasi-2D $CsPb_2Br_5$ Emitter Layer for Perovskite Light-Emitting Diodes and Lasing

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Low-cost and room-temperature solution-processed inorganic two dimensional perovskites with strong exciton binding energy, chemistry stability, and color-tunable photoluminescence are promising for light-emitting diodes (LEDs) and laser application.[1] However, efficient pure inorganic quasi-2D perovskite based PeLEDs have not been realized yet. Here centrifugal-coated quasi-2D $CsPb_2Br_5$ films from nanocrystal colloidal are successfully developed. This technique allows for the formation of very thin continuous layers of high-quality quasi-2D $CsPb_2Br_5$ which is challenging for traditional spin-coating methods as shown in Fig. 1. Through thickness control process and without additional treatment, we obtained a compact and uniform $CsPb_2Br_5$ emitter layer with a photoluminescence quantum yield of 35% and demonstrated perovskite LEDs with good external quantum efficiency of 2.6%. We in-situ studied the carrier traps of complete $CsPb_2Br_5$ based LEDs and observed two types of traps using thermally stimulated current technique. Further, a random lasing from centrifugal-coated quasi-2D $CsPb_2Br_5$ film was also demonstrated with a promising low threshold.[2]

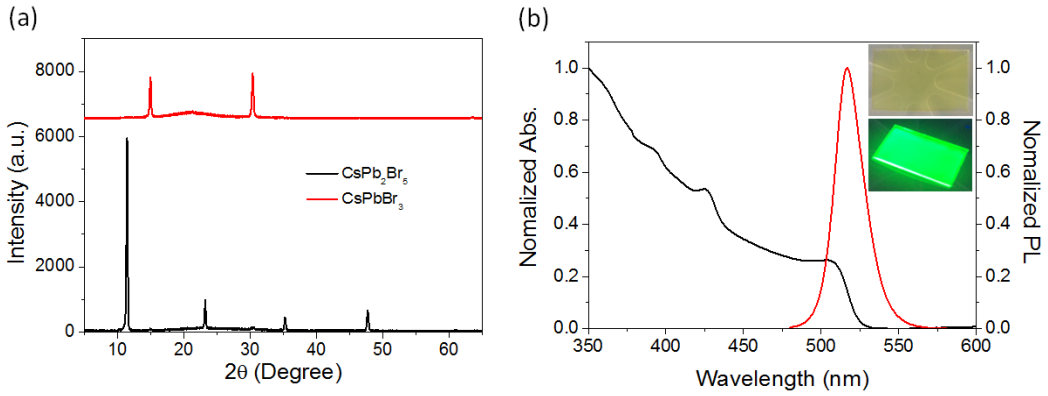

Figure 1. (a) XRD spectra of centrifugal casted $CsPb_2Br_5$ film and vapor deposited $CsPbBr_3$ film. (b) Absorption and photoluminescence spectra of $CsPb_2Br_5$ films. Insert is images of film under UV lamp irradiation.

References:

1. S. A. Veldhuis, P. P. Boix, N. Yantara, M. Li, T. Sum, N. Mathews, S. G. Mhaisalkar, *Adv. Mater.* **2016**, *28*, 6804.

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