

## Supplementary information

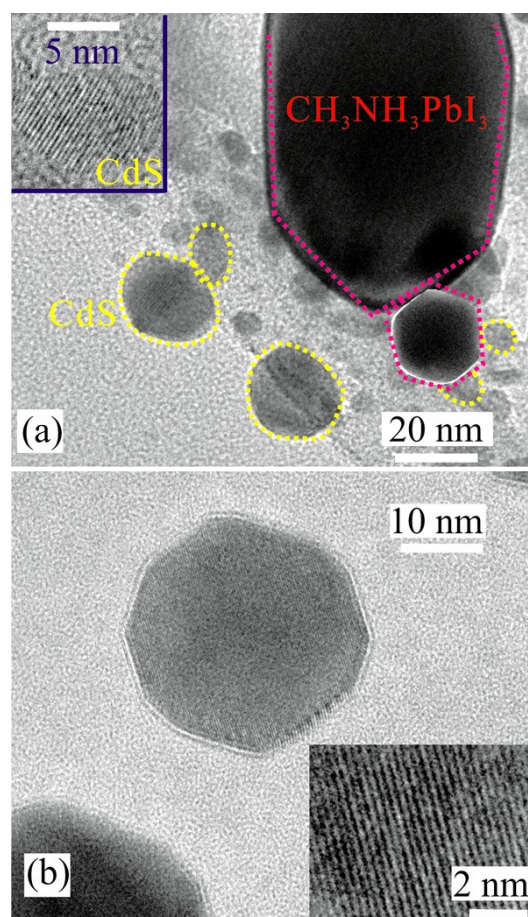


Figure 4

**Figure S1.** (a) The TEM image of  $\text{CH}_3\text{NH}_3\text{PbI}_3:\text{CdS}$  (0.1) composite film and the inset is the HR-TEM image of one single  $\text{CdS}$  nanoparticle. (b) The HR-TEM image of one single  $\text{CH}_3\text{NH}_3\text{PbI}_3$  particle.