



**Extended Data Figure 9 | Representative two-peak spectra for individual CsPbBr<sub>2</sub>Cl nanocrystals.** a–i, Photoluminescence spectra of different single nanocrystals that exhibit two emission peaks at a targeted temperature of 5 K (see Fig. 3 caption). Each spectrum was recorded with a linear polarizer in the detection path. Therefore, the relative intensities

displayed cannot be used to determine the relative (potentially thermal) population within the fine-structure multiplet. The linear polarizer was used here because it can be rotated to resolve all spectral features. Without the polarizer, the low-energy peak typically dominates in intensity.