Supporting Information

Changes in near-bandgap photoluminescence in lead halide $CsPbBr_3$ perovskite, subjected to extreme conditions

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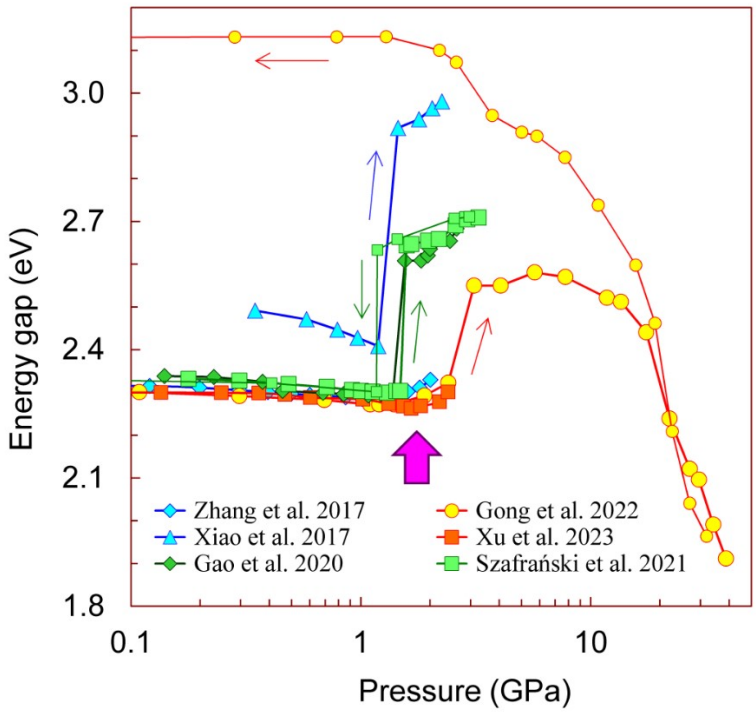

Fig. S1. Pressure dependence of the energy gap of different samples of $CsPbBr_3$ perovskite at room temperature, taken from the literature [1-6]. Zhang *et al.* - Ref. [1] for a bulk sample in silicone oil medium; Szafrański *et al.* - Ref. [2] for a single-crystal plate in isopropanol medium; Gong *et al.* - Ref. [3] for a single crystal in silicone oil medium; Xu *et al.* - Ref. [4] for a quantum dots in silicone oil medium; Gao *et al.* - Ref. [5] for a nanocrystal in silicone oil medium; Xiao *et al.* - Ref. [6] for a nanocrystal in silicone oil medium. Thin arrows indicate the direction of pressure variation. A bold vertical arrow between 1 and 2 GPa points a phase transition to a disordered phase.

Sample Characterization. The XRD patterns of HPT-CsPbBr3 were recorded with a Bruker D8 Venture diffractometer with a CMOS PHOTON III detector and an IμS 3.0 microfocus source (Cu Kα radiation, λ = 1.54178 Å, Montel focusing mirrors) at 298K. Debye diffraction patterns with continuous diffraction arcs were obtained by φ-scanning (0.5°-frames, 360°; Fig. S4). For the PXRD patterns (Figs. S2 and S3), to diminish the effect of the preferred orientations, five φ-scans for as-is-CsPbBr3 and HPT-CsPbBr3 were made at different positions of a goniometer for ω from –240° to 0° [7]. The external standard (Si) correction and integration were performed using the Dioptas program [8].

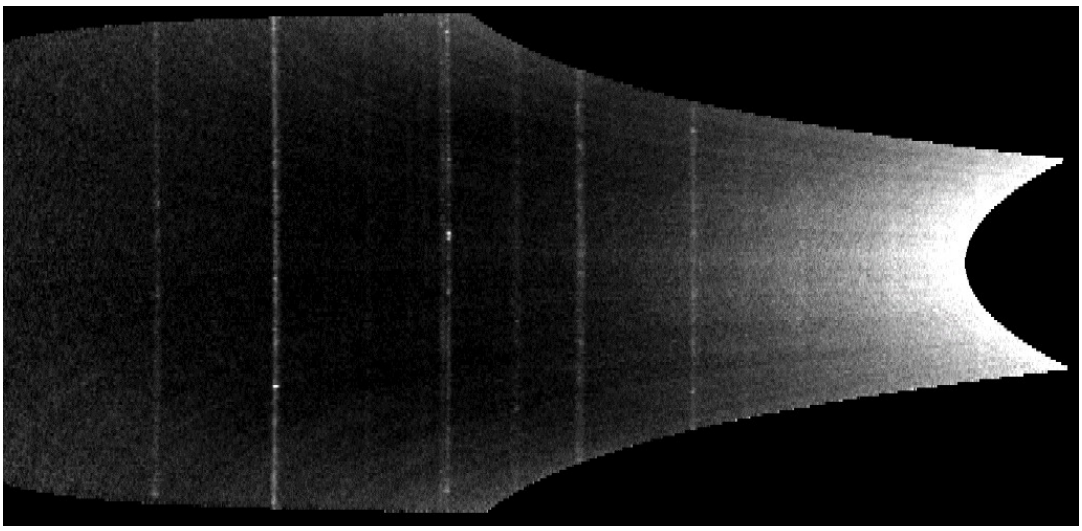

Fig. S2. 2D integration pattern (φ-scan 360°) of the HPT-CsPbBr3 sample.

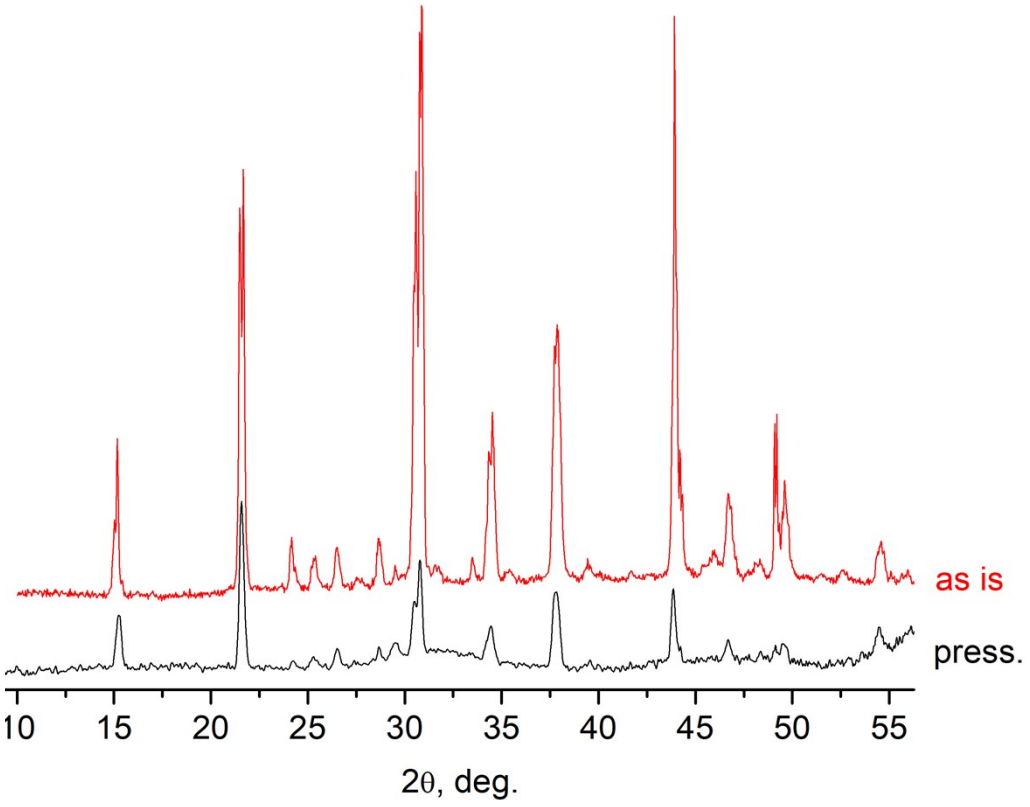

Fig. S3. Experimental powder X-ray diffraction patterns of origin CsPbBr3 and HPT-CsPbBr3 samples (Cu Kα).

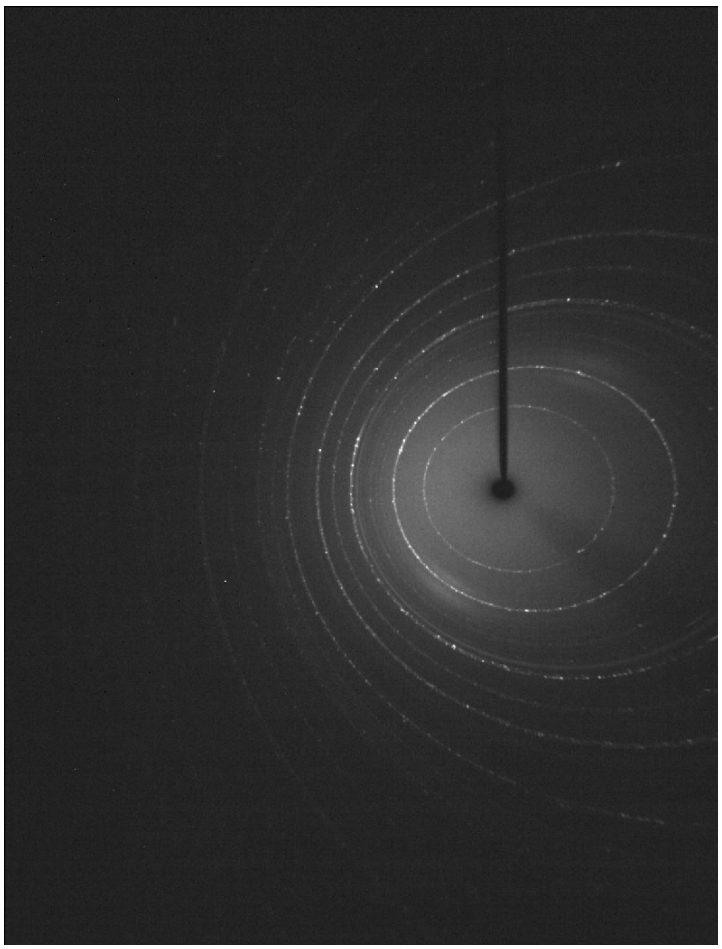

Fig. S4. Debye rings (φ-scan of 0.5°-frames) of the HPT-CsPbBr3 sample.

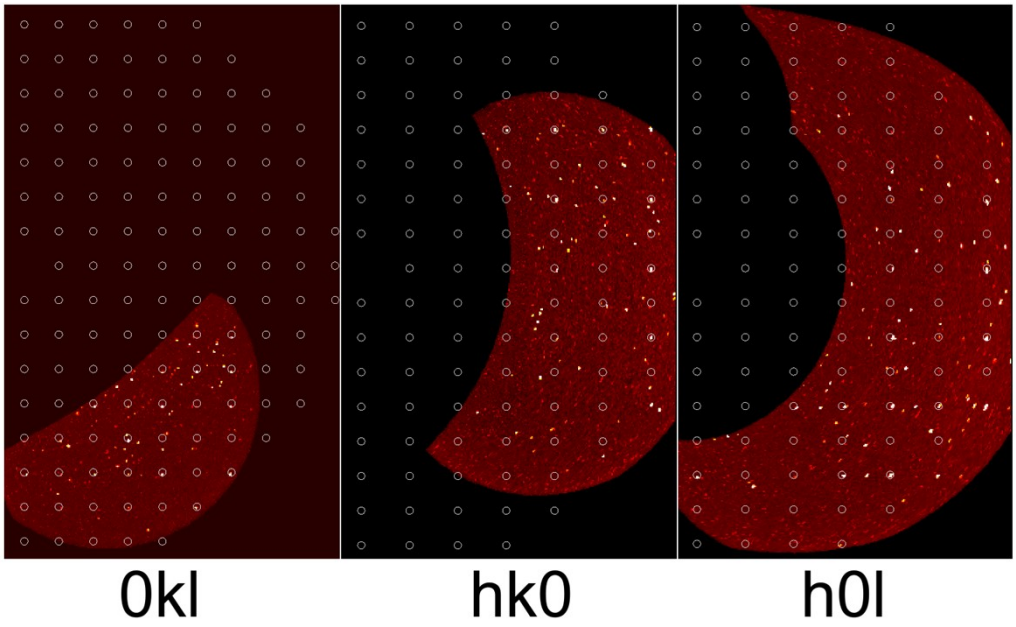

Fig. S5. Reciprocal space reconstructions for the HPT-CsPbBr3 sample. White circles indicate positions of the reflections for the orthorhombic P lattice, a = 5.872 Å, b = 8.213 Å, c = 8.254 Å, V = 398.1 Å3. Superstructural reflections are unobserved.

References

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