Supplementary Information

Synergistic mesoporous silica confinement and PMMA encapsulation enabling highly stable $CsPbX_3$ composite films for wide-color-gamut backlighting

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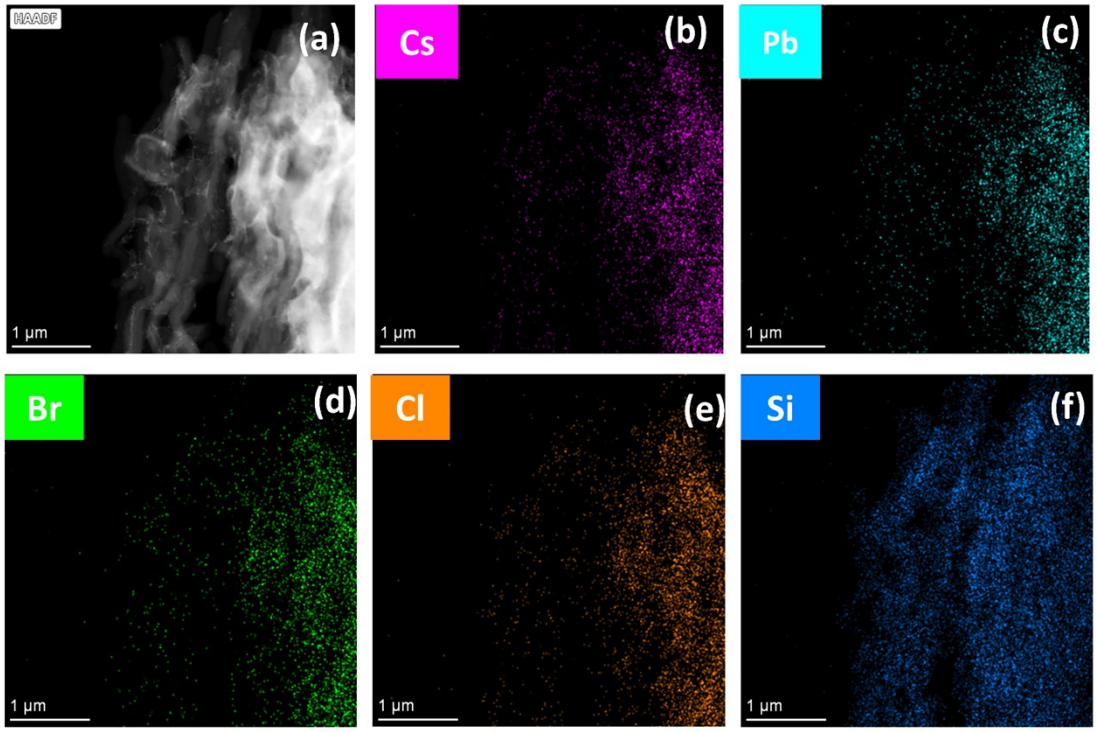

Fig. S1 (a-f) TEM image and EDS elemental mapping images of Cs, Pb, Cl, Br, and Si in B-SBA.

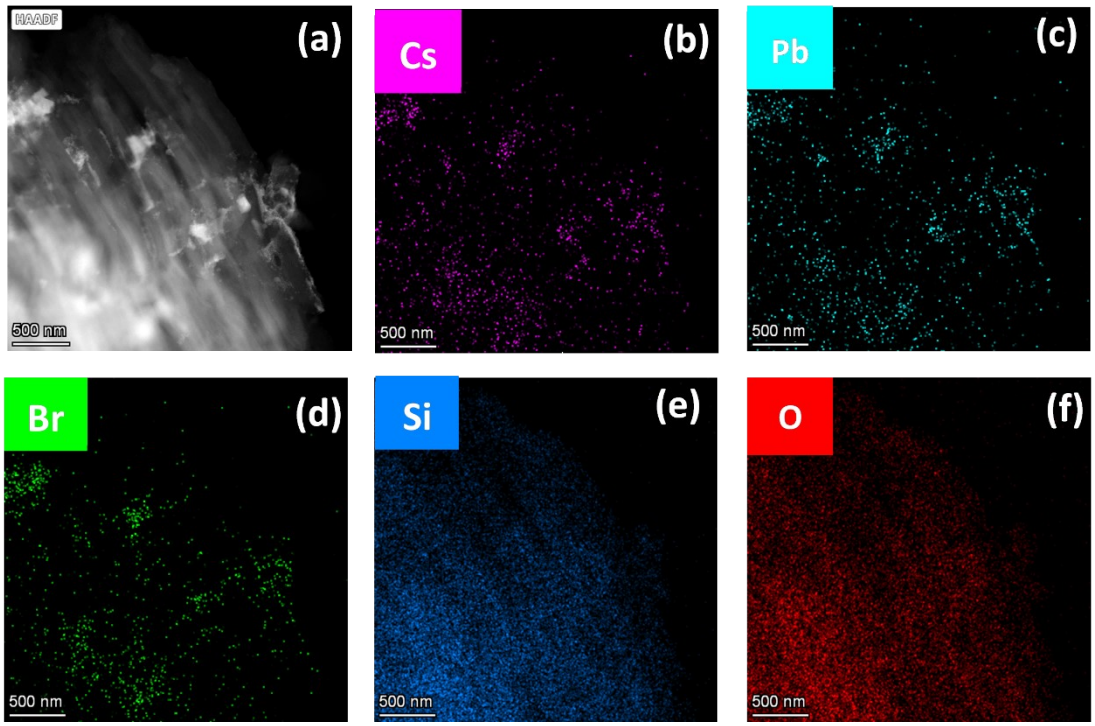

Fig. S2 (a-f) TEM image and EDS elemental mapping images of Cs, Pb, Cl, Br, Si, and O in G-SBA.

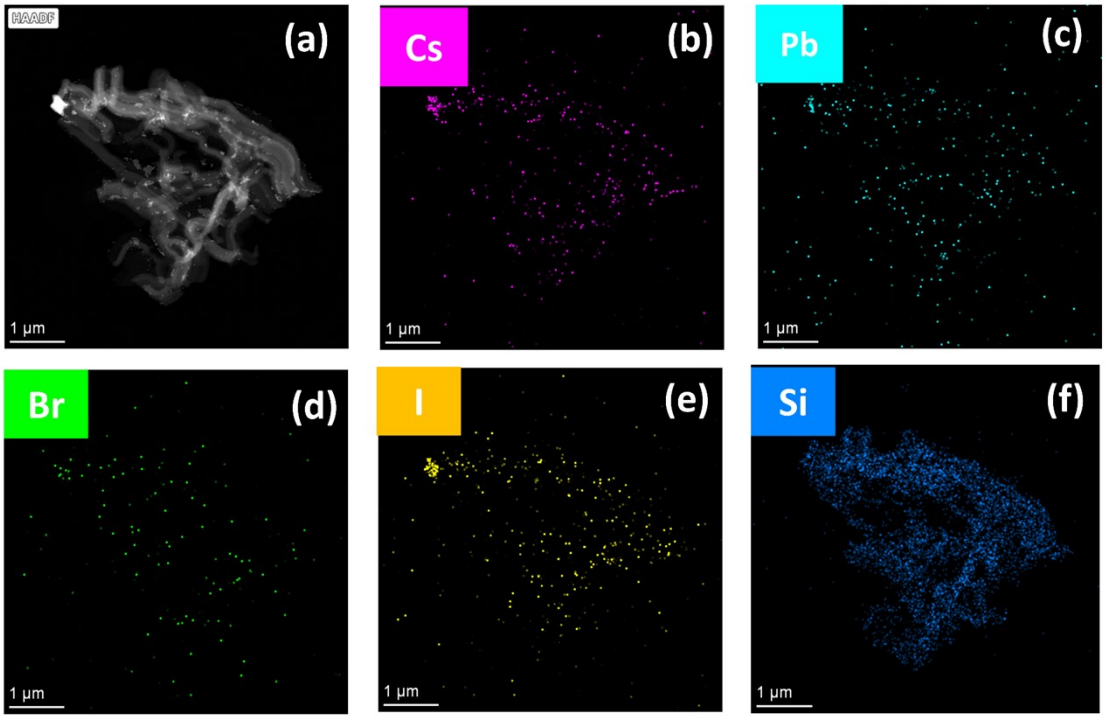

Fig. S3 (a-f) TEM image and EDS elemental mapping images of Cs, Pb, Br, I, and Si in R-SBA.

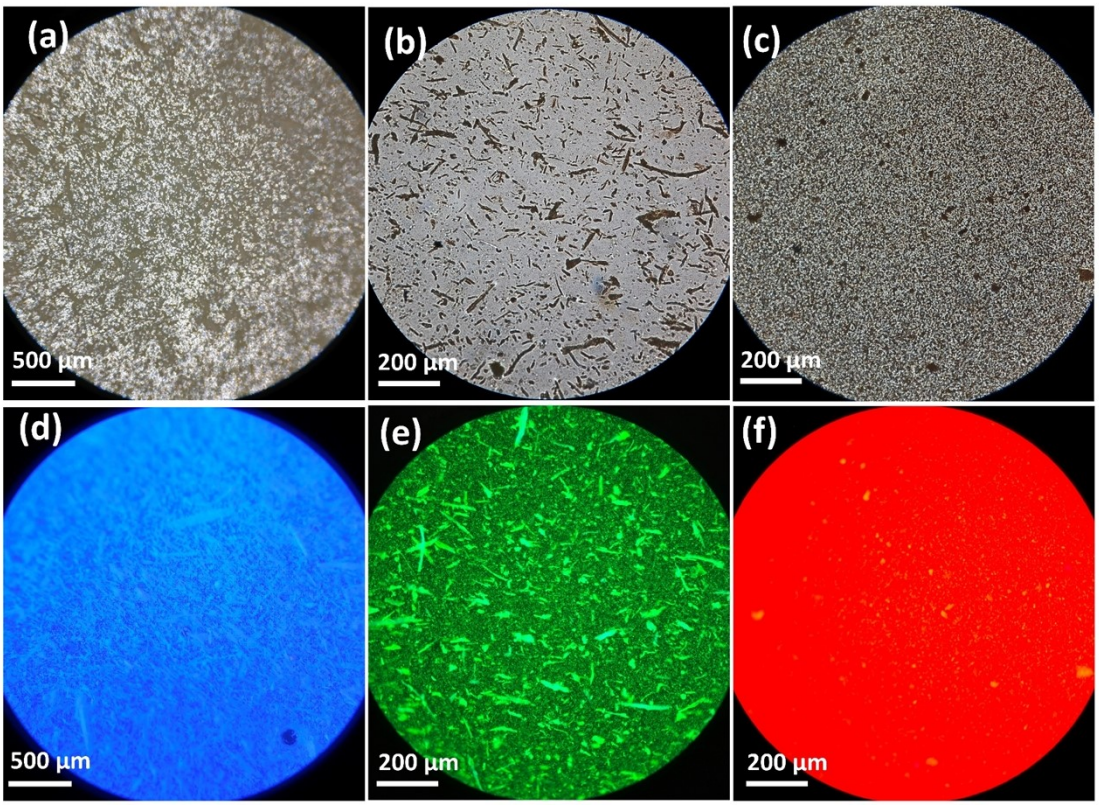

Fig. S4 Optical microscope images of (a-c) B-SBA/PMMA, G-SBA/PMMA, and R-SBA/PMMA composite films and (d-f) the corresponding films under UV light illumination (365 nm).

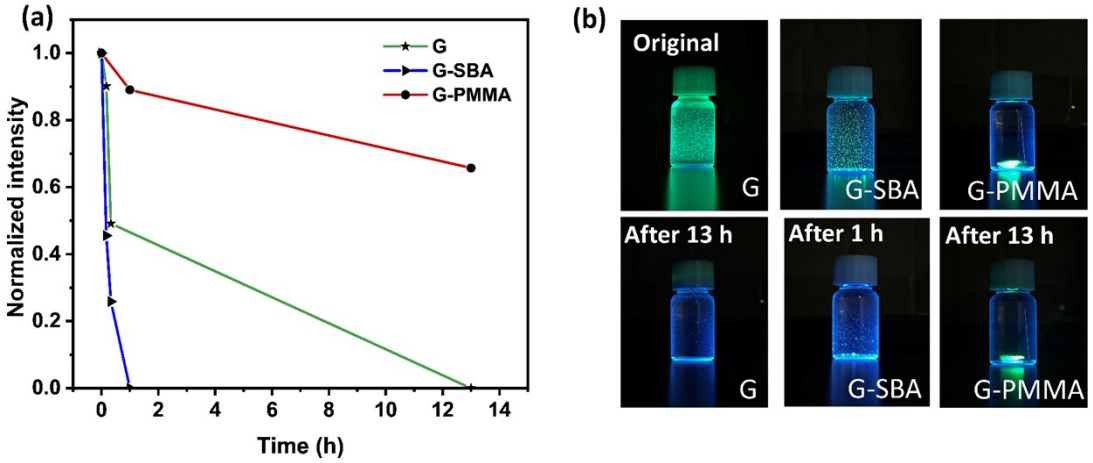

Fig. S5 (a) Time-dependent PL intensity of G, G-SBA, and G-PMMA immersed in water. (b) Photographs of G, G-SBA, and G-PMMA immersed in water.

Fig. S6 Photograph of B-SBA/PMMA, G-SBA/PMMA, and R-SBA/PMMA composite films with varying thicknesses stacked together to construct a white-light-emitting composite film.

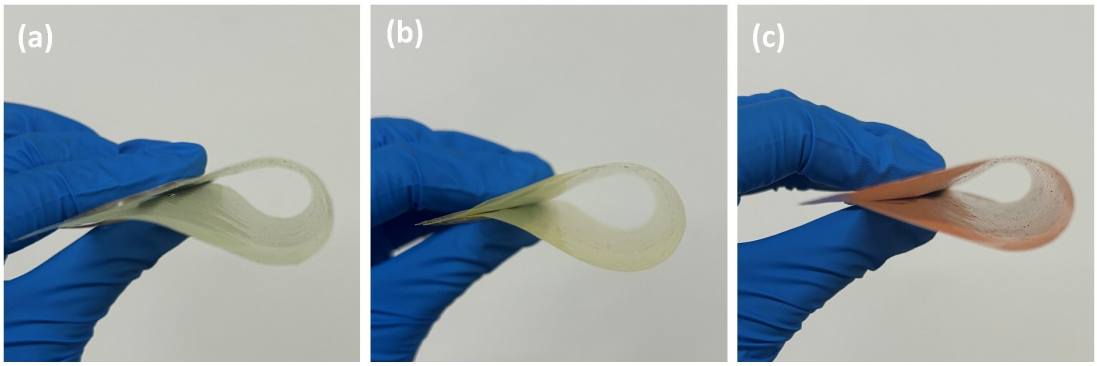

Fig. S7 Photograph of (a-c) B-SBA/PMMA, G-SBA/PMMA, and R-SBA/PMMA composite films with under bending.

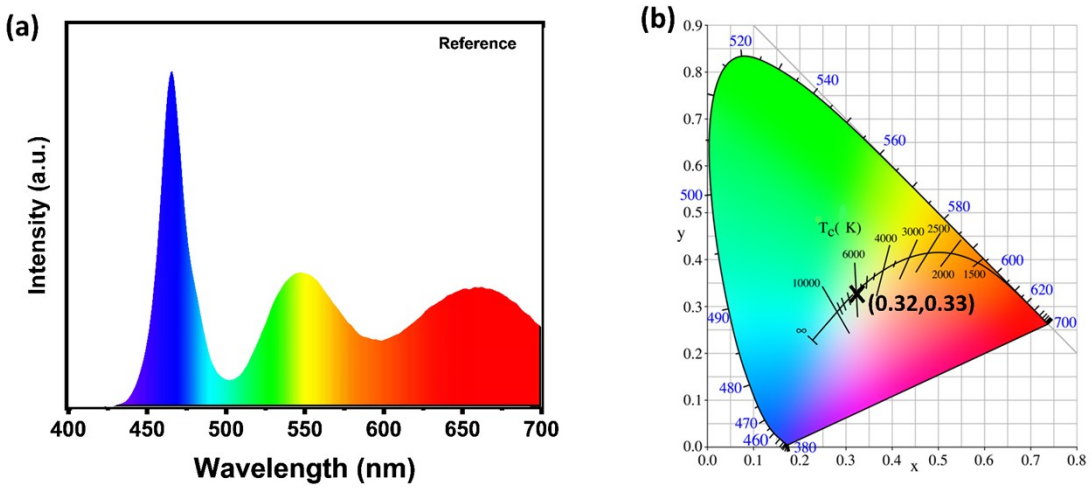

Fig. S8 (a) PL spectrum of the WLED fabricated by the reference phosphor. (b) CIE coordinates of the WLED containing a reference sample.