Supplementary Information

Enhanced amplified spontaneous emission from morphology-controlled organic-inorganic halide

perovskite films

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Lou,[a] Feng Teng[a] and Yanbing Hou*[a]

Key laboratory of Luminescence and Optical Information, Ministry of Education, Beijing JiaoTong University, Beijing 100044,
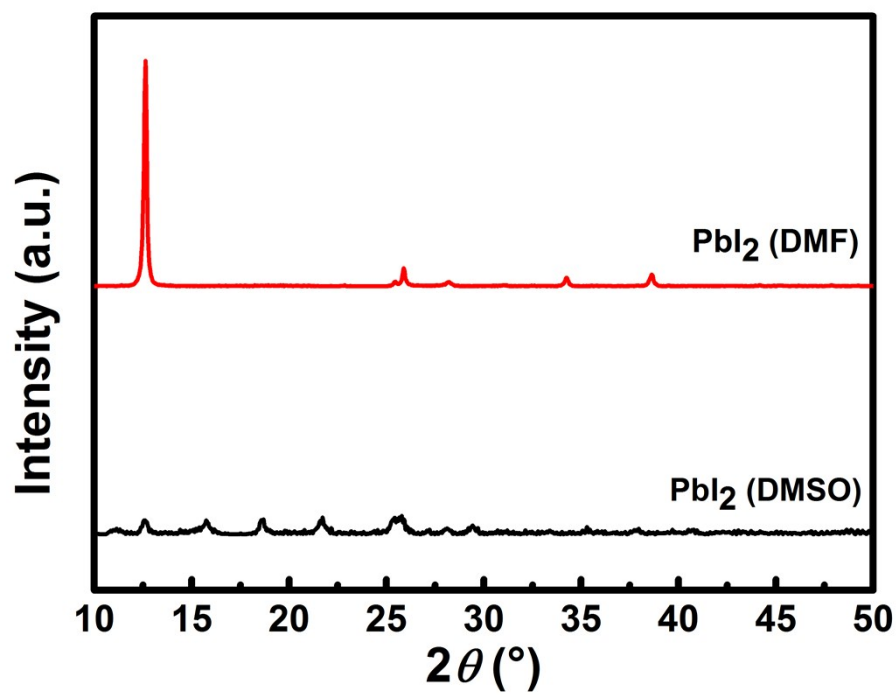
China. E-mail: ybhou@bjtu.edu.cn

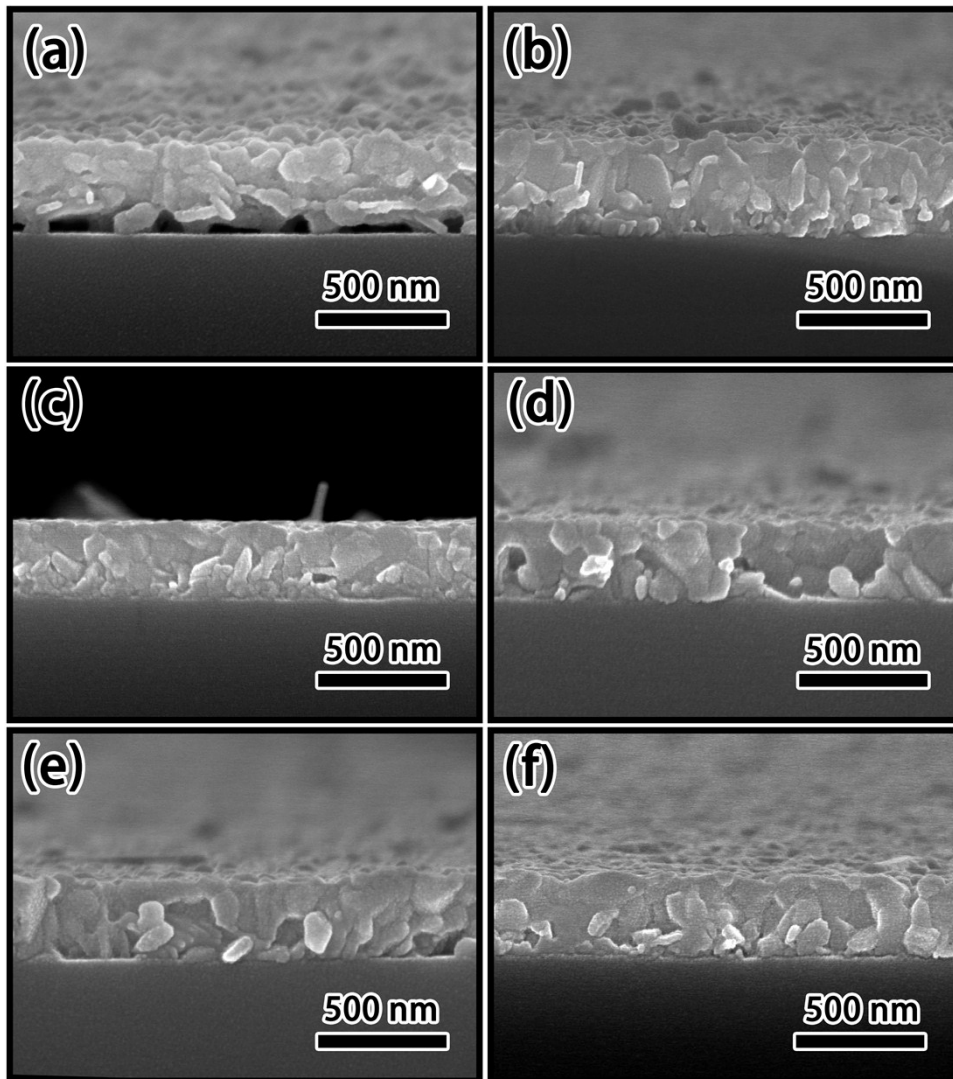Fig. S1. XRD patterns of DMF and DMSO based PbI$_2$ films.

Fig. S2. Cross-sectional SEM images of perovskite films converted from the PbI$_2$ films spin coated

from the binary solvent (DMF:DMSO) solutions in 10:0 (a), 8:2 (b), 6:4 (c), 4:6 (d), 2:8 (e), and 0:10 (f)
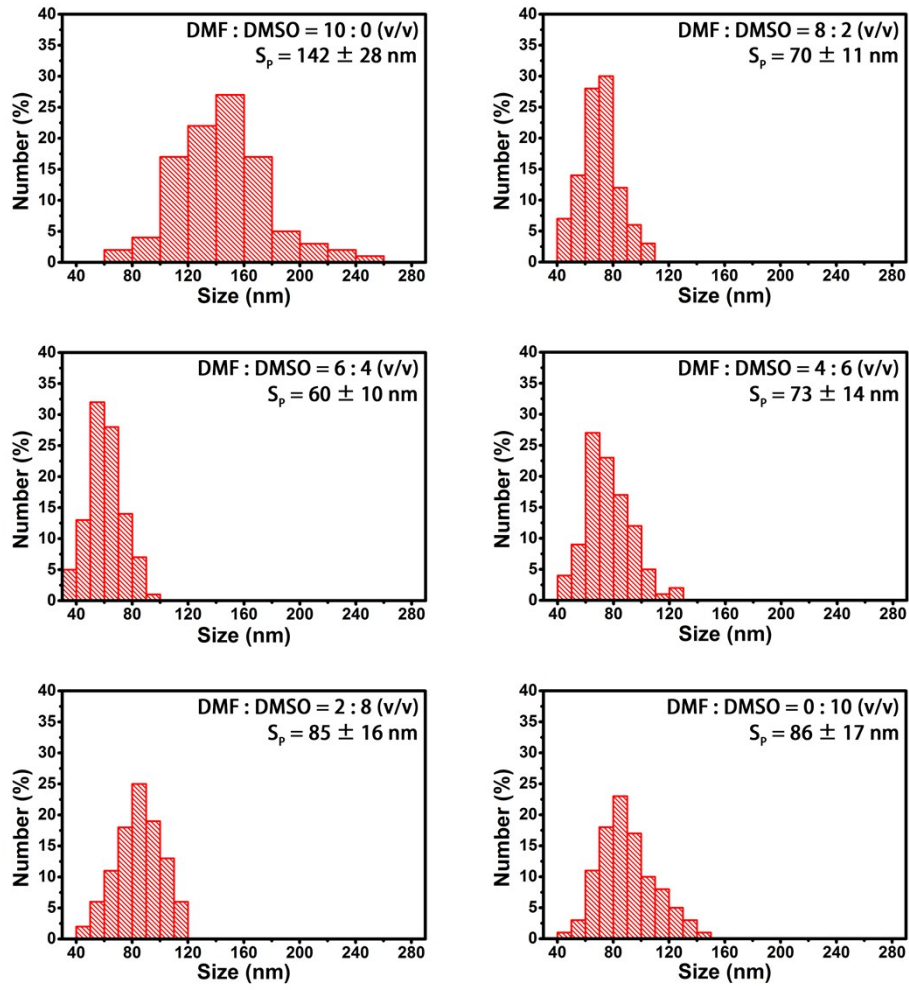
ratios.

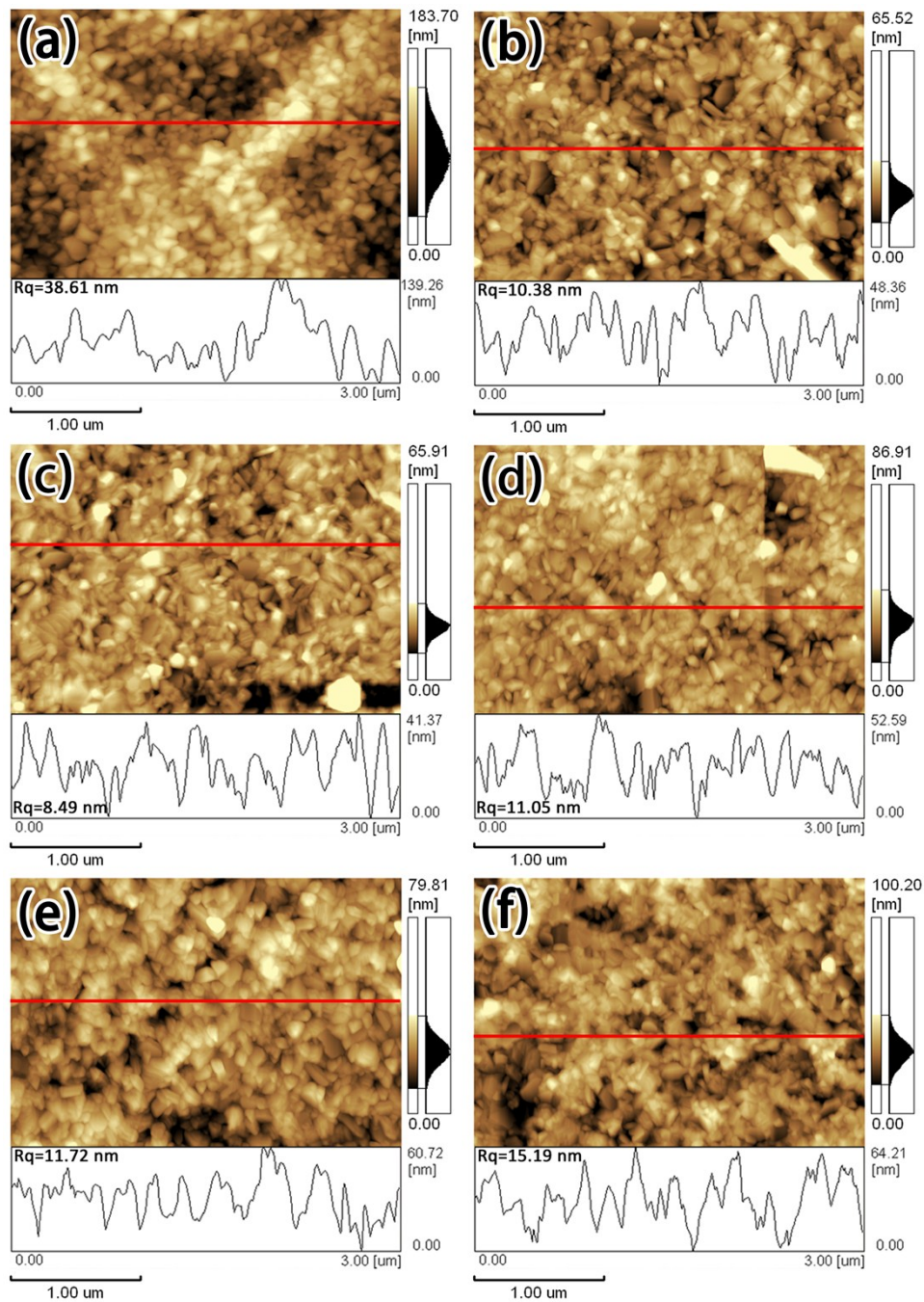Fig. S3. Histogram of average particle size (S_p) for each perovskite thin film from the SEM images.

Fig. S4. AFM images of perovskite films converted from the PbI$_2$ films spin coated from the binary

solvent (DMF:DMSO) solutions in 10:0 (a), 8:2 (b), 6:4 (c), 4:6 (d), 2:8 (e), and 0:10 (f) ratios. The

bottom curve is the roughness profile along the corresponding red line in each figure.
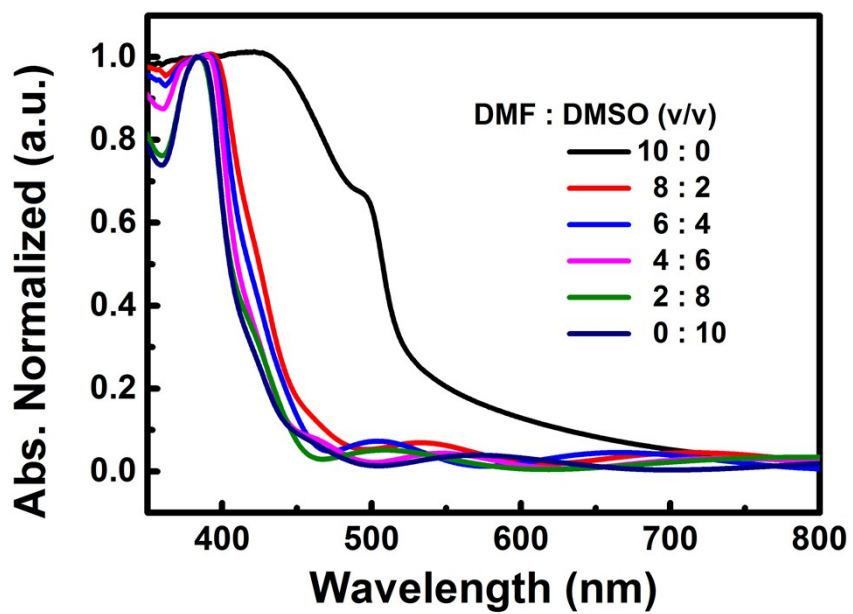
Fig. S5. UV-vis absorption spectra of PbI$_2$ films fabricated from DMF:DMSO binary solution in 10:0,

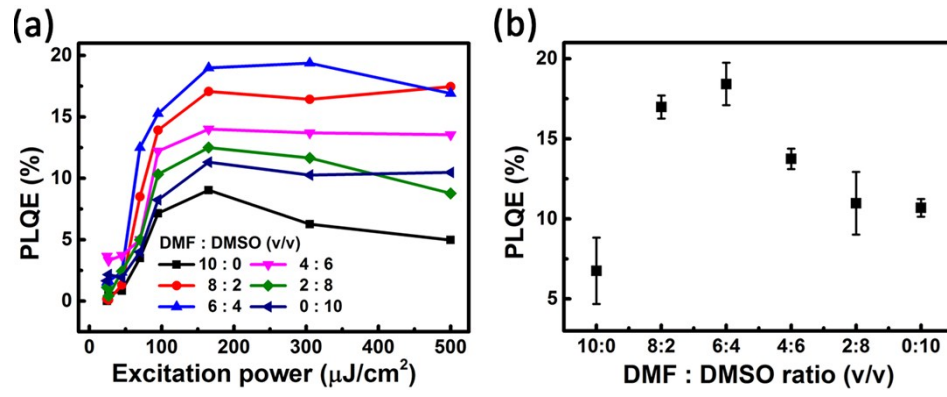8:2, 6:4, 4:6, 2:8, and 0:10 ratios (v/v).

Fig. S6. PLQE of MAPbI$_3$ perovskite films based on PbI$_2$ (solvent) layers which prepared by binary

solvent in different ratio.