Supporting information—Methanol as anti-solvent to improve the low open-circuit voltage of CsPbBr$_3$ perovskite solar cells prepared with water

Figure S1. The Voc and PCE box chart of CsPbBr$_3$ device obtained by CsBr/H$_2$O solution.

Figure S2. The contact angle image of (a) PbBr$_2$ layer to CsBr/H$_2$O solution and (b) PbBr$_2$ layer added with 2-Hydroxyethylurea to CsBr/H$_2$O solution.
Figure S3. The CsPbBr$_3$ film prepared with CsBr/H$_2$O solution treated (a) without and with (b) MT, (c) IPA, and (d) ET.

Figure S4. The J-V curve of CsPbBr$_3$ PSCs treated with IPA and ET.
Figure S5. The J-V curve of CsPbBr$_3$ PSCs contained 2-Hydroxyethylurea treated with IPA and ET.

Figure S6. SEM spectra of (a) PbBr$_2$ layer and (b) PbBr$_2$ layer contained 2-Hydroxyethylurea; (c) XRD image of PbBr$_2$ layer and PbBr$_2$ layer contained 2-Hydroxyethylurea.
Figure S7. (a) UV-vis, (b) PL spectra of methanol anti-solvent treated CsPbBr$_3$ films obtained from the PbBr$_2$ layers with and without 2-Hydroxyethylurea.

Figure S8. The structural formula of 2-Hydroxyethylurea.

Table S1. The coefficient of TRPL double exponential function fitting curve.

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<th>perovskite film</th>
<th>$A_1$ (%)</th>
<th>$A_2$ (%)</th>
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