Electronic Supporting Information

Surface Passivation by Congeneric Quantum Dots for High-Performance and Stable CsPbBr$_3$-Based Photodetectors

Shikai Yan, a Sheng Tang, a Manman Luo, a Lu Xue, a Shilin Liu, a Elias Emeka Elemike, b Byung Seong Bae, c Javed Akram, a Jing Chen, a Zhiwei Zhao, a Zhuoya Zhu, a Xiaobing Zhang, a Wei Lei a and Qing Li a

a Joint International Research Laboratory of Information Display and Visualization, School of Electronic Science and Engineering, Southeast University, Nanjing, Jiangsu, P. R. China

b Chemistry Department, North-West University, South Africa

c Department of Electronics & Display Engineering, Hoseo University, Hoseo Ro 79, Asan city, Chungnam 31499, Korea

d Department of Physics, COMSATS University Islamabad, Islamabad 45550, Pakistan

E-mail: lw@seu.edu.cn; liqing@seu.edu.cn
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Figure S2. (a, b) EDX measurement of CsPbBr$_3$ films without and with QDs on the surface. (c) EDX mapping of QDs-modified CsPbBr$_3$ film.
Figure S3. (a) Illustration depicting the function of CsPbBr3 QDs as buffer layer in PDs. (b) Optical microscope image and camera picture (inset) of the as-prepared sample, half of which is covered by QDs. (c) AFM height and (d) phase patterns of CsPbBr3 films WO and with CsPbBr3 QDs on the surface.

Figure S4. XPS spectra of CsPbBr3 films WO and with CsPbBr3 QDs.

Figure S5. Current density–voltage (J–V) curves of the PDs using QDs with one to three purification cycles under (a) 409 nm light with intensity of 100 mW cm⁻² and (b) dark condition. (c) Schematic diagram of the change of ligands densities and surface defects densities...
after different purification cycles.

**Table S1.** The VBM and CBM values of CsPbBr$_3$ film without and with QDs

<table>
<thead>
<tr>
<th>Sample</th>
<th>VBM (eV)</th>
<th>CBM (eV)</th>
</tr>
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<tbody>
<tr>
<td>Unmodified CsPbBr$_3$ film</td>
<td>5.61</td>
<td>3.25</td>
</tr>
<tr>
<td>QDs-modified CsPbBr$_3$ film</td>
<td>5.58</td>
<td>3.22</td>
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</table>

**Figure S6.** (a) UPS spectra of the unmodified perovskite films and QDs-modified CsPbBr$_3$ films. (b) Energy-level diagram of the materials used in the PDs.

**Figure S7.** Responsivity and detectivity curves of the QDs-modified PDs as a function of light wavelength at 0.04 V.

**Figure S8.** I-V curves of QDs-modified PDs under 409 nm light illumination with different luminous densities.
Figure S9. Photoresponse characteristics of the QDs-modified PDs to pulsed light irradiation at frequencies of (a) 10 KHz, (b) 20 KHz, (c) 100 KHz under a voltage of 0 V.

Figure S10. Water contact angle on the CsPbBr<sub>3</sub> films (a) WO and (d) with QDs.

Table S2. Fitting parameters extracted from EIS test.

<table>
<thead>
<tr>
<th>Device</th>
<th>$R_s$ (Ω)</th>
<th>$R_r$ (Ω)</th>
<th>$R_{rec}$ (Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WO QDs</td>
<td>13.7</td>
<td>1323</td>
<td>3282</td>
</tr>
<tr>
<td>with QDs</td>
<td>4.5</td>
<td>1926</td>
<td>52320</td>
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