Supporting Information

A modified two-step sequential deposition method for preparing perovskite CH3NH3PbI3 solar cells

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Figure S1 XRD patterns of (a) SSE-PbI$_2$ films and (b) SC-PbI$_2$ films with different immersing time in MAI 2-propanol solution.
Figure S2 AFM images of (a) SC-SS-MAPI film, (b) SSE-SS-MAPI film, (c) SC-immers-MAPI film, and (d) SSE-immers-MAPI film.
Figure S3 The EQE spectrum (red) and the integrated photocurrent density (blue) of the best performed device fabricated with the SSE-SS-MAPI film expected to be generated under AM 1.5G irradiation.
Figure S4 Statistical average device parameters extracted from J-V curves as a function of four groups of devices prepared with four different kinds of MAPI films.

Group I: SSE-SS-MAPI; Group II: SC-immere-MAPI; Group III: SSE-immere-MAPI; Group IV: SC-SS-MAPI.
**Figure S5** J-V curves of the best performed device fabricated with the SSE-SS-MAPI film with different scan rate.

**Table S1** Summary of performance parameters of the best performed device fabricated with the SSE-SS-MAPI film with different scan direction at scan rate of 57.5 mV s-1.

<table>
<thead>
<tr>
<th>Scan direction</th>
<th>$V_{oc}$ (V)</th>
<th>$J_{sc}$ (mA cm$^{-2}$)</th>
<th>FF (%)</th>
<th>$\eta$ (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backward</td>
<td>1.032</td>
<td>19.85</td>
<td>69.9</td>
<td>14.3</td>
</tr>
<tr>
<td>Forward</td>
<td>1.023</td>
<td>19.55</td>
<td>59.3</td>
<td>11.9</td>
</tr>
</tbody>
</table>