Supporting Information

Low-temperature Processed TiO\textsubscript{x} Electron Transport Layer for Efficient Planar Perovskite Solar Cells

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Figure S2. Forward Scan and Reverse Scan J-V curves of (a) TiO$_x$ and TiO$_2$ films deposited on FTO-substrate; (b) TiO$_x$ film grown on ITO-substrate.
| ETLs Layer | Rs (Ω) | R1(Ω) | CPE1-T | CPE1-P | R2(Ω) | CPE2-T | CPE2-P |
|------------|--------|--------|--------|--------|--------|--------|--------|
| TiOx       | 36.8   | 160.6  | 2.02E-8| 1.05   | 123.5  | 3.05E-8| 0.946  |
| TiO2       | 28.3   | 105.4  | 3.73E-8| 1.02   | 116    | 5.26E-8| 0.920  |
Table S2. Summary of device performance characteristics with TiO$_x$ and TiO$_2$ based PSCs.

| ETLs Layer | Scan direction | $J_{sc}$ (mA/cm$^2$) | $V_{oc}$ (V) | $FF$ | PCE (%) |
|------------|----------------|----------------------|-------------|------|---------|
| TiO$_x$    | Forward        | 20.44                | 1.10        | 0.50 | 11.21   |
|            | Reverse        | 20.64                | 1.12        | 0.63 | 14.51   |
| TiO$_2$    | Forward        | 21.21                | 1.04        | 0.46 | 10.12   |
|            | Reverse        | 21.06                | 1.08        | 0.68 | 15.50   |
Table S3. Summary of device performance characteristics with TiOx film deposited on ITO-substrate based PSCs.

| ETLs Layer | Scan direction | $J_{sc}$ (mA/cm²) | $V_{oc}$ (V) | $FF$ | PCE (%) |
|------------|----------------|------------------|--------------|------|---------|
| ITO-TiOx   | Forward        | 16.94            | 0.99         | 0.54 | 9.13    |
|            | Reverse        | 19.02            | 1.01         | 0.58 | 11.13   |