

Supporting Information

Electron Transport Improvement of Perovskite Solar Cell via ZIF-8 Derived Porous Carbon Skeleton

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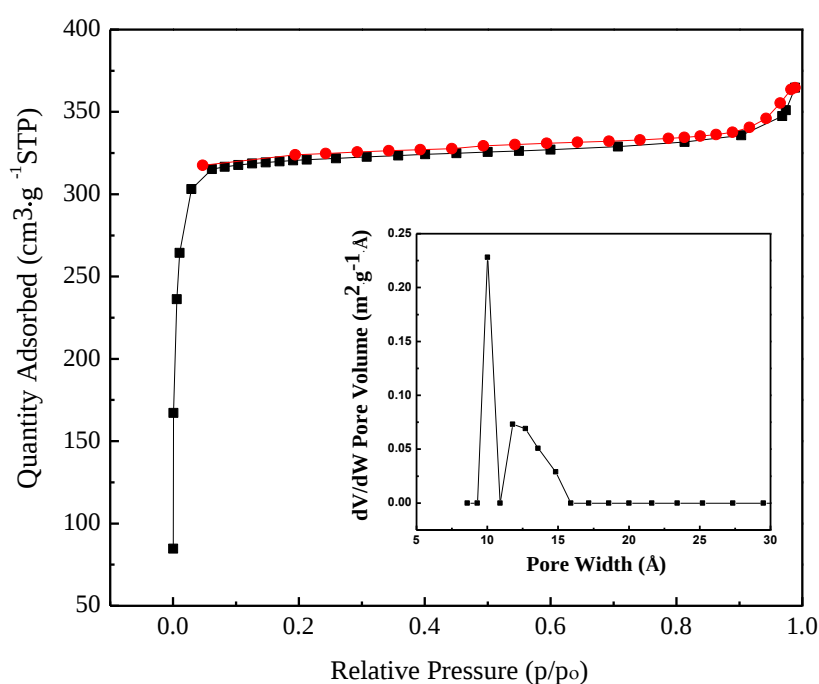


Fig. S1 N₂ adsorption and desorption isotherm of ZIF-8 prepared with PVP and the corresponding pore diameter distribution (inset).

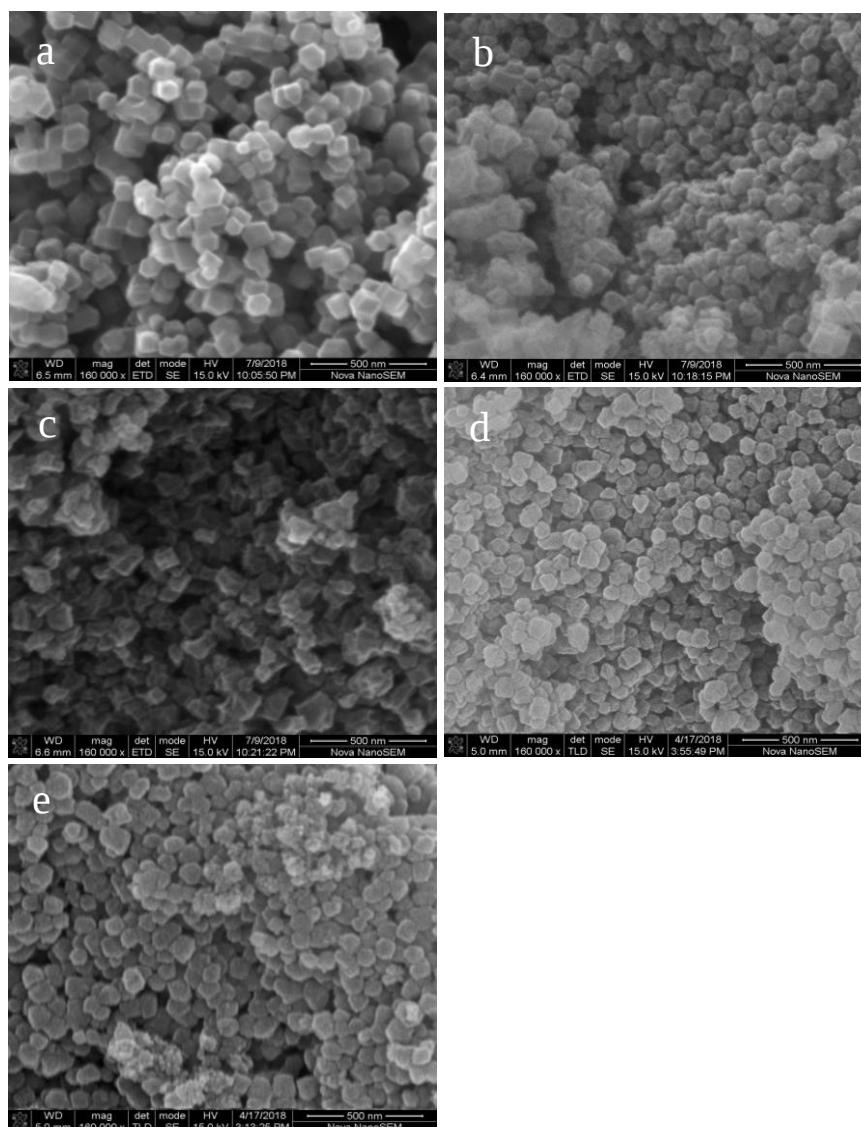


Fig. S2. SEM surface images of ZIF-8 particle powders carbonized at 0 °C (a), 450 °C (b), 500 °C (c), 550 °C (d) and 600 °C (e).

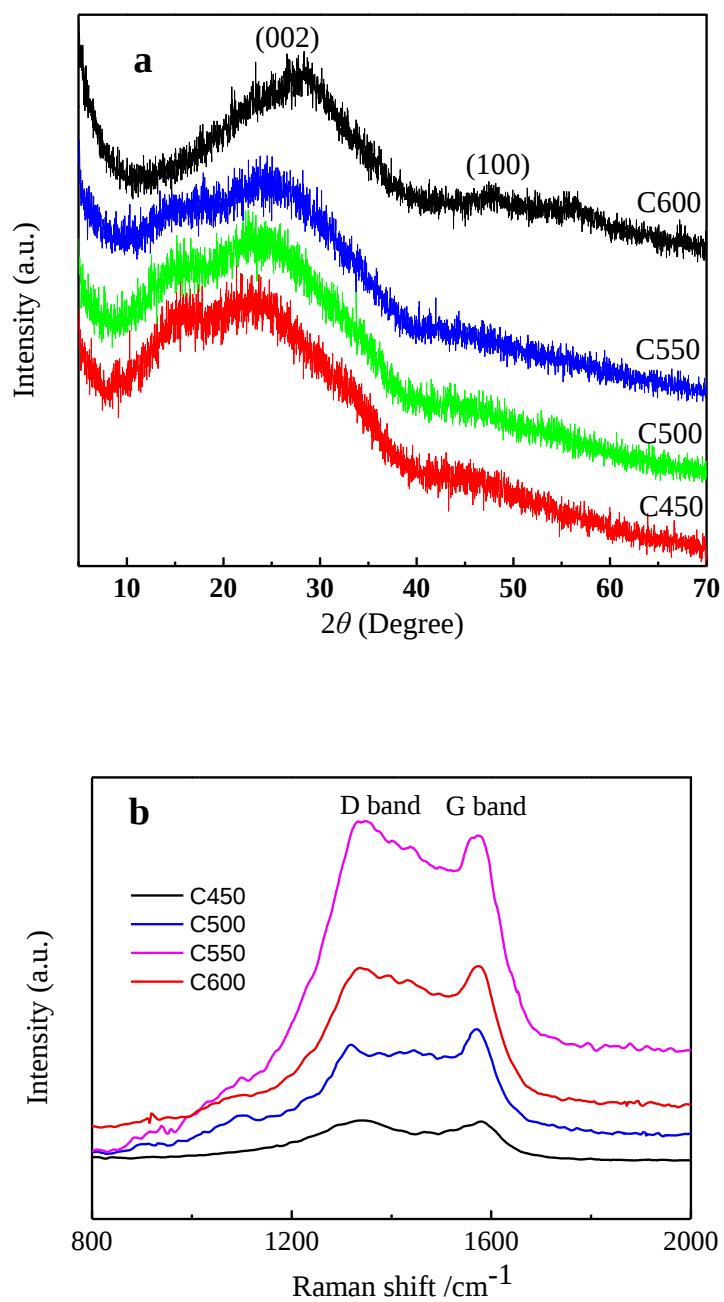


Fig. S3 XRD (a) patterns and Raman (b) of C450, C500, C550 and C600.

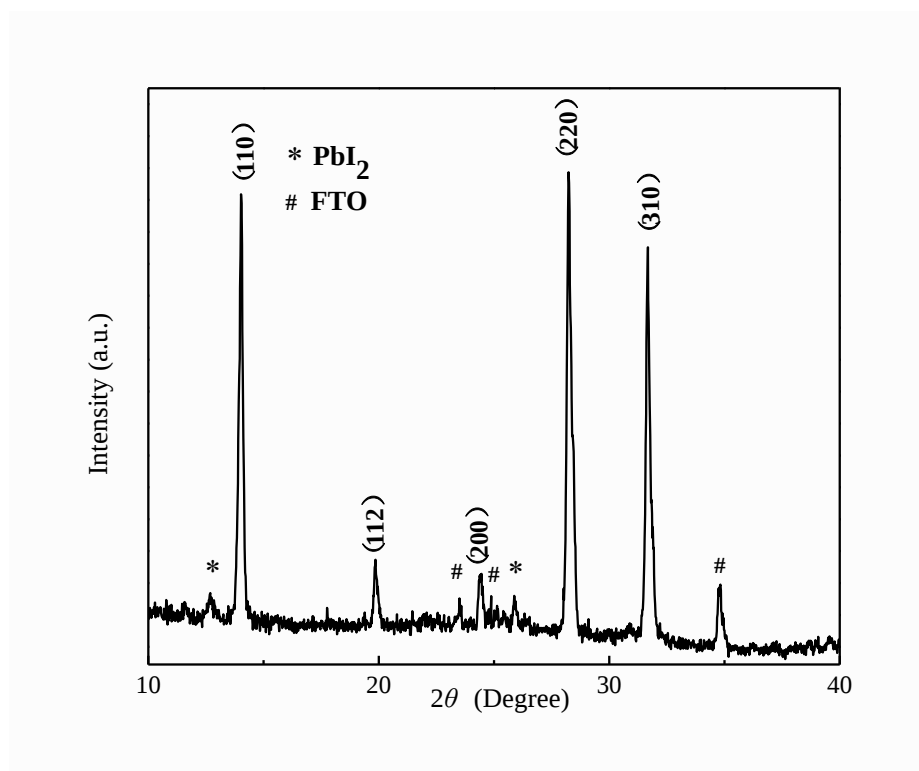


Fig. S4 XRD pattern of the perovskite film deposited on TiO₂ coated ZIF-8 derived porous carbon layer.

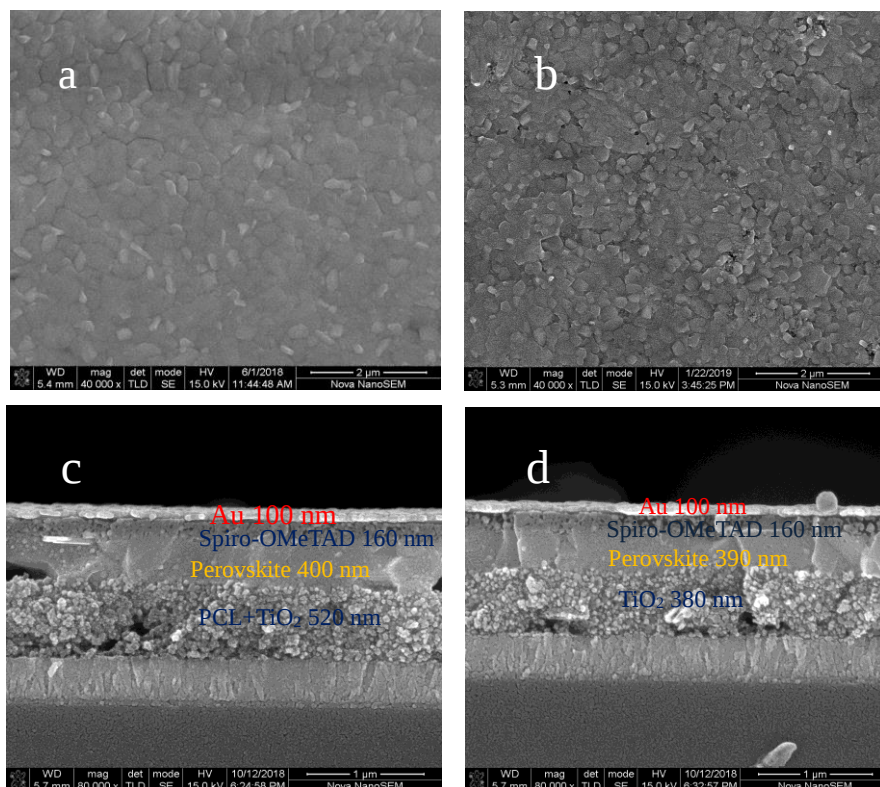


Fig. S5 SEM top-view images of perovskite thin film deposited on TiO_2 nanocrystalline thin film with (a) and without (b) ZIF-8 derived porous carbon layer and the cross-sectional SEM images of the whole perovskite solar cell with (c) and without (d) ZIF-8 derived porous carbon layer.

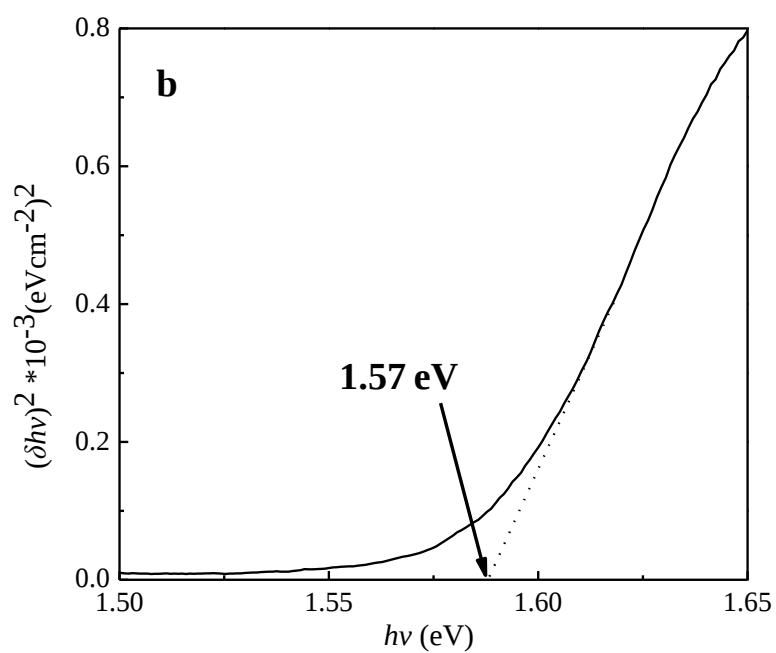
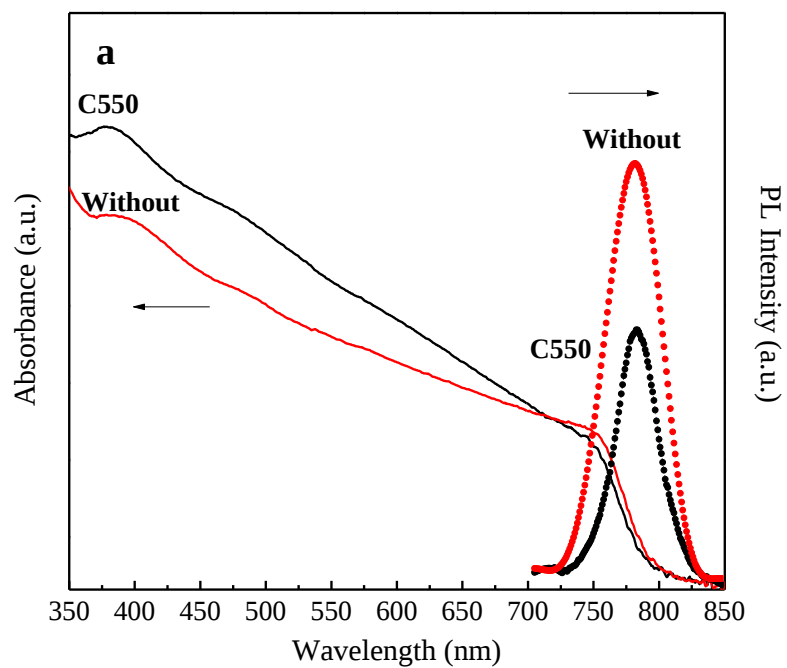


Fig. S6 Absorption spectra (solid lines) and photoluminescence spectra (dot lines) of perovskite thin film and the film on the derived porous carbon layer (a) and Tauc plot of the perovskite thin film on the derived porous carbon layer (b).

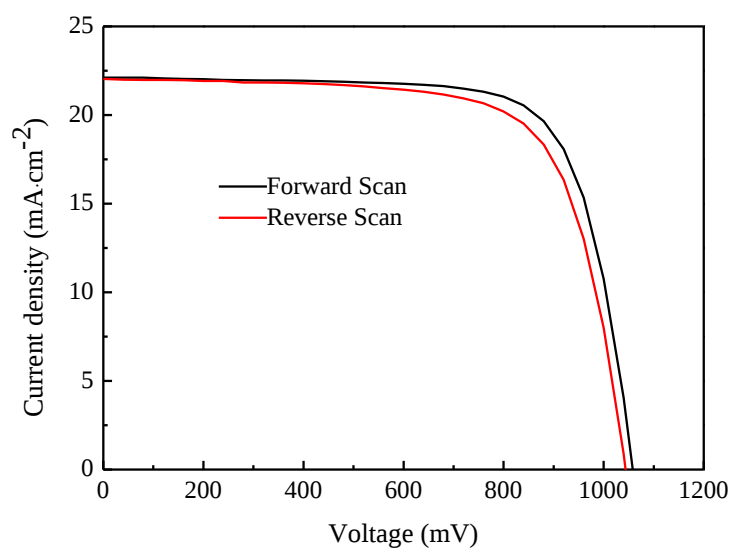


Fig. S7 J - V curves under reverse/backward voltage scan for perovskite solar cell based on C550 porous carbon layer.

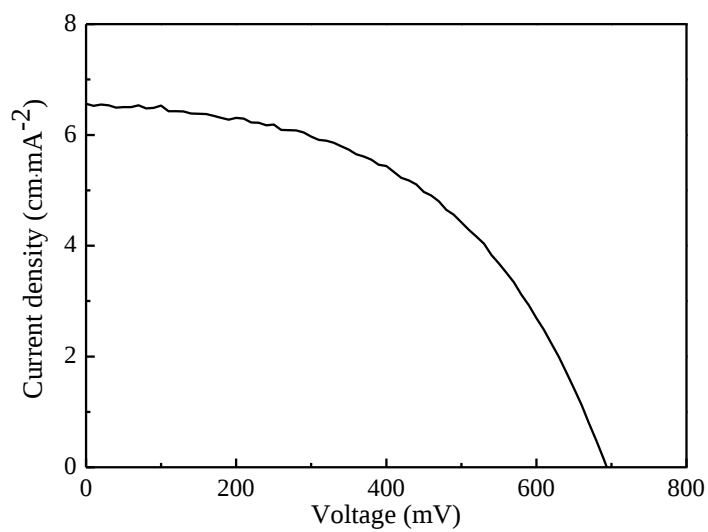


Fig. S8 J - V curve with efficiency of 2.25% (J_{sc} =6.51 mA cm⁻², V_{oc} =6.9 V, ff =0.50) for perovskite solar cell based on C550 porous carbon layer without TiO₂.