

Enhancement of photocurrent in ultra-thin perovskite solar cell by Ag nanoparticles deposited at low temperature

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Supporting information

Fig. S1

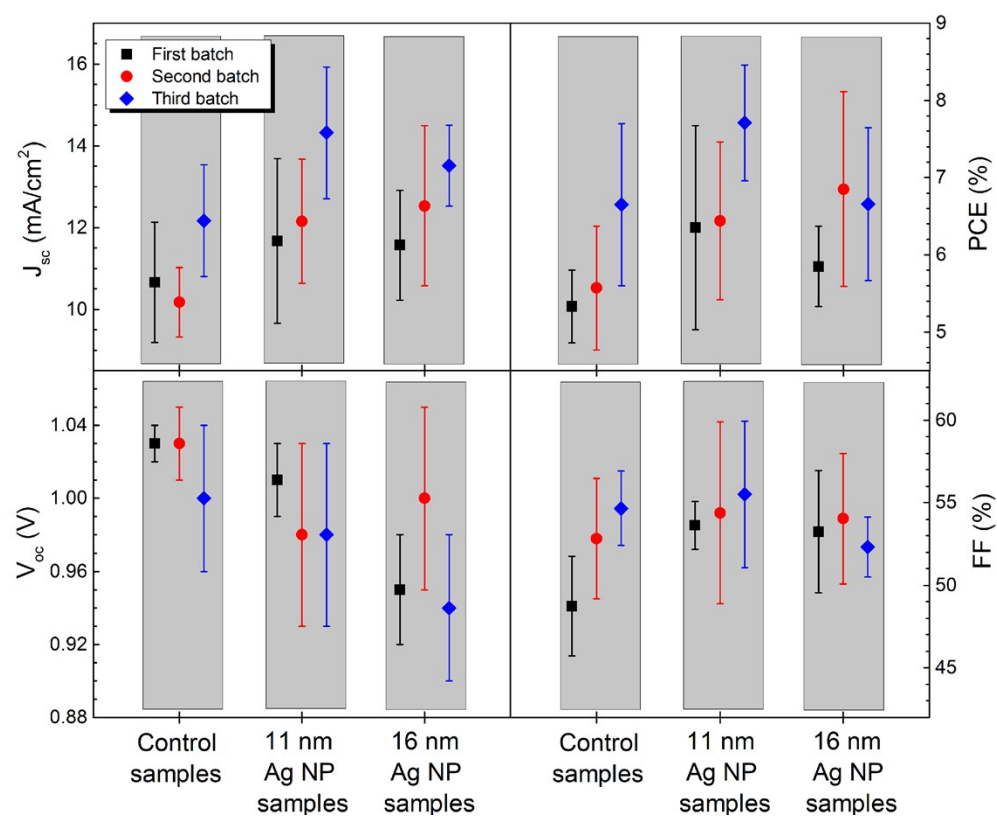


Fig. S1 Average devices performances in three different batches of control samples, 11 nm Ag NP samples and 16 nm Ag NP samples measured by reverse scan.

Fig. S2

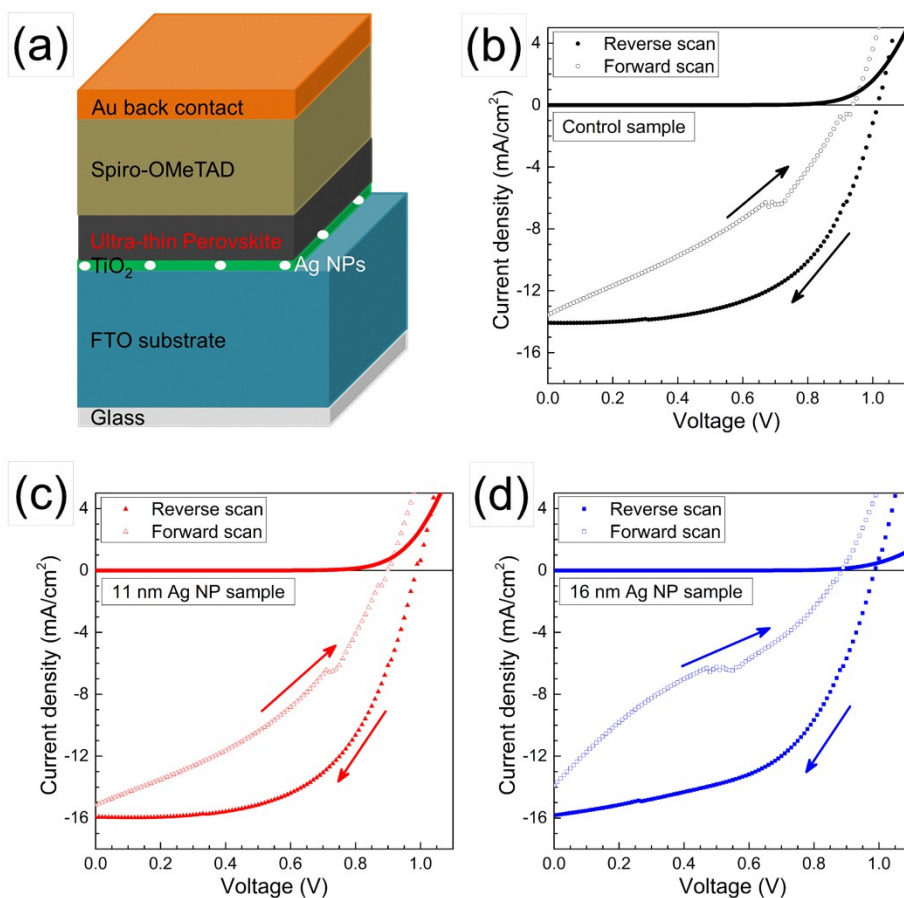


Fig. S2 (a) Schematic device structure of ultra-thin perovskite solar cell with incorporation of Ag nanoparticles at the TiO_2/FTO interface. $J-V$ curves of the best PCE ultra-thin perovskite solar cells without (control sample) (b) and with 11 nm (11 nm Ag NP sample) (c), 16 nm (16 nm Ag NP sample) (d) Ag NPs.

Fig. S3

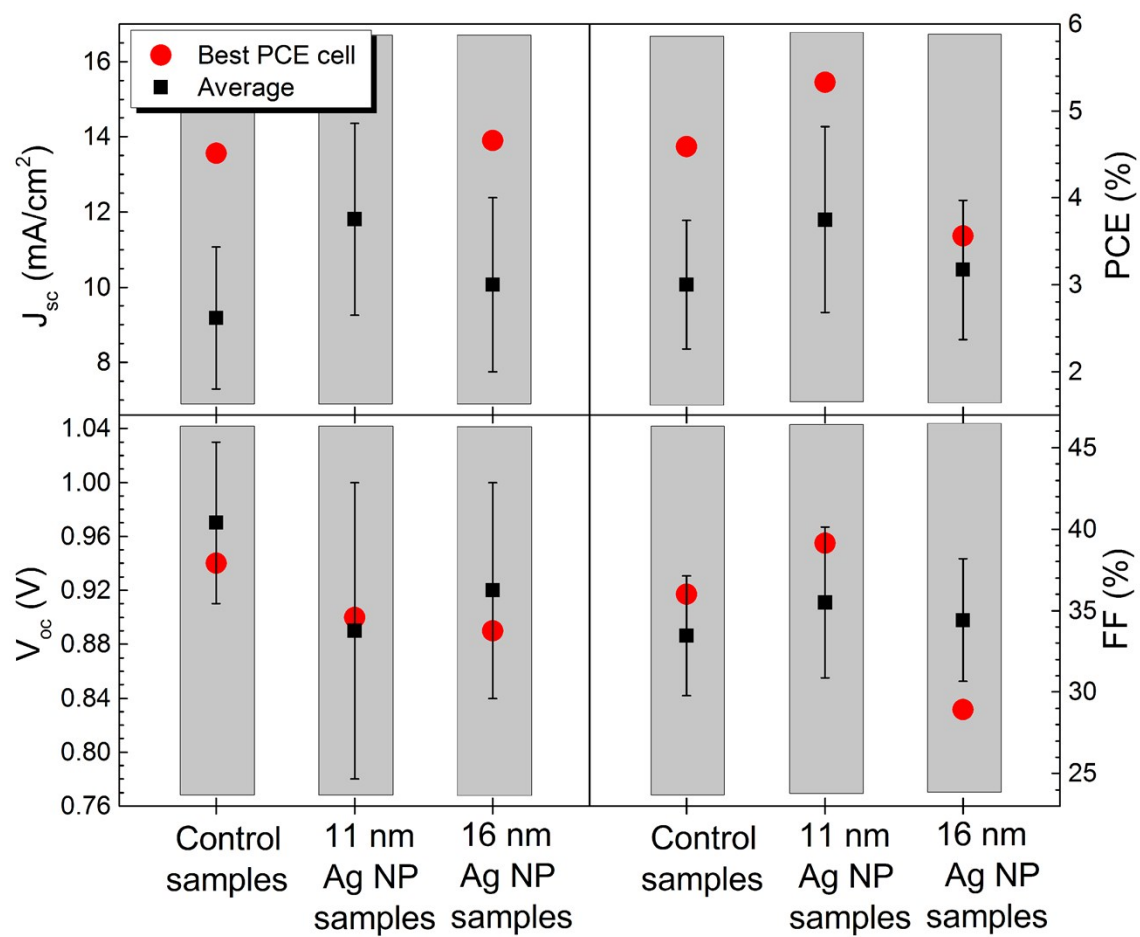


Fig. S3 Average devices performances of control samples, 11 nm Ag NP samples and 16 nm Ag NP samples measured by forward scan.

Fig. S4

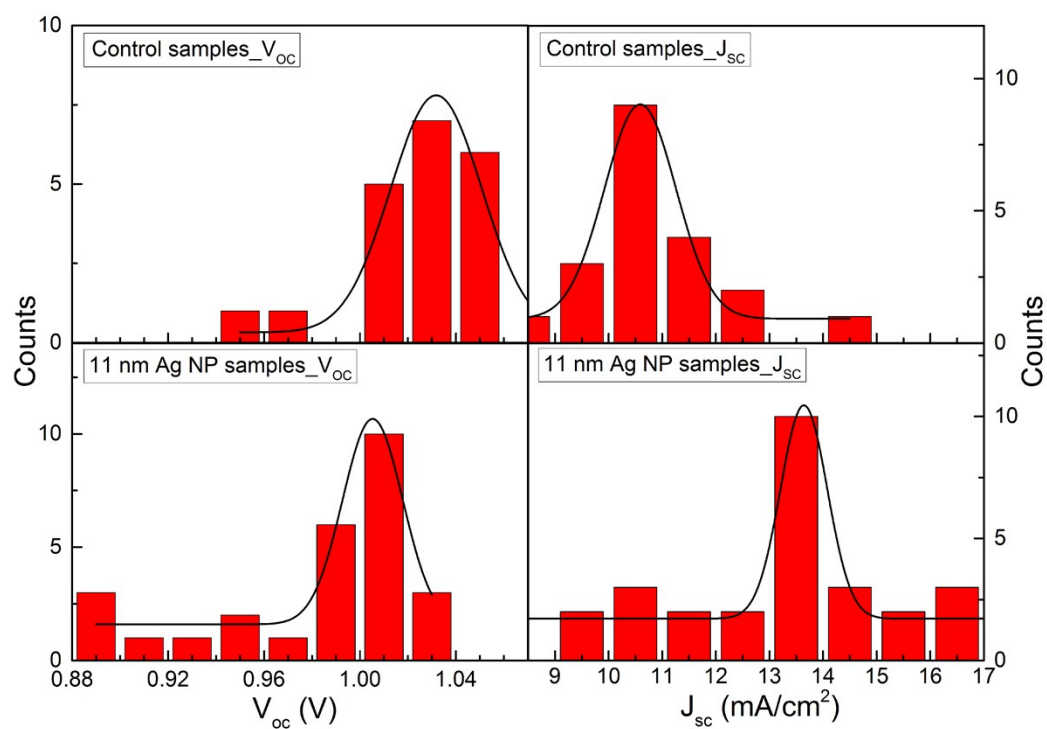


Fig. S4 V_{oc} and J_{sc} histograms of the control samples and of the 11 nm Ag NP samples.

Fig. S5

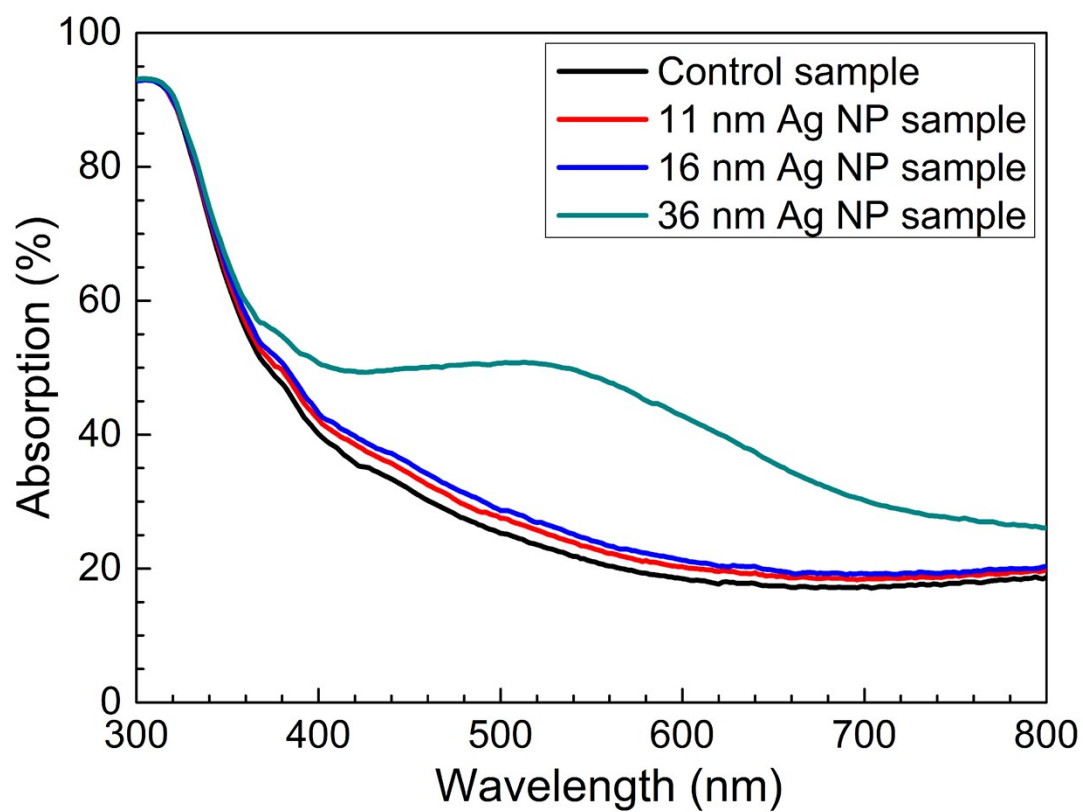


Fig. S5 Absorption spectra of TiO_2 layer/(with and without) different sizes of Ag NPs/FTO/glass.

Fig. S6

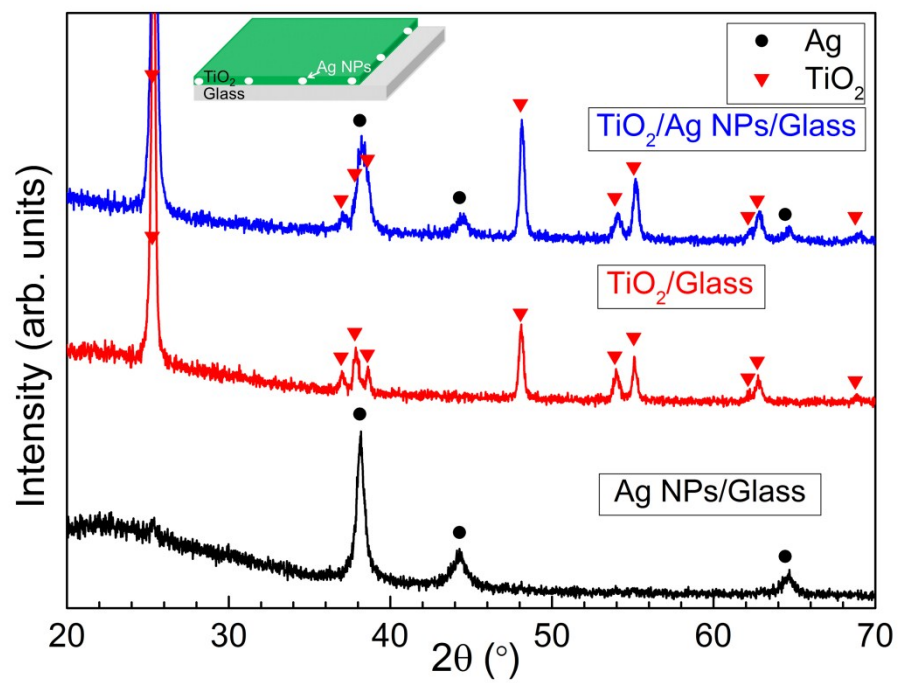


Fig. S6 XRD spectra of Ag NPs/glass, TiO₂/glass and TiO₂/Ag NPs/glass samples.

Fig. S7

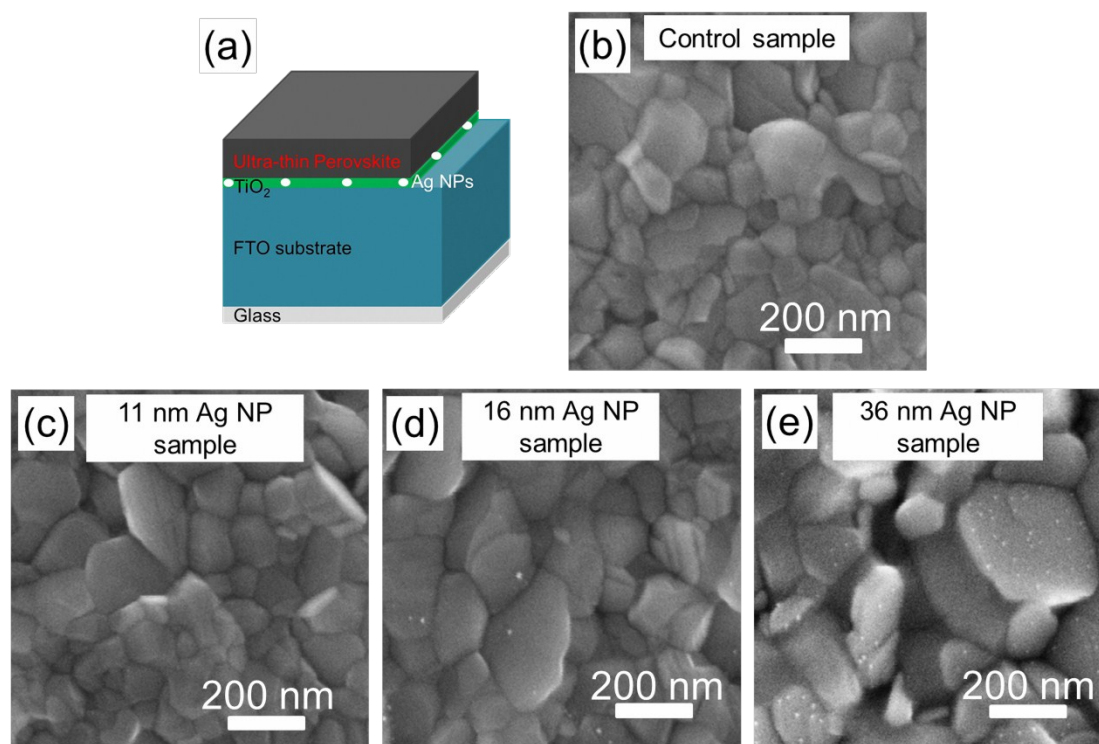


Fig. S7 (a) Schematic sample structure of perovskite layer/ TiO_2 /Ag NPs/FTO/glass. (b-e) SEM images of perovskite layer/ TiO_2 layer/different sizes of Ag NPs/FTO/glass, among which are (b) control sample, (c) 11 nm Ag NP sample, (d) 16 nm Ag NP sample, (e) 36 nm Ag NP sample.