

ASSOCIATED CONTENT

Supporting Information

Fluoride passivation of ZnO electron transport layers for efficient
PbSe colloidal quantum dot photovoltaics

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cells

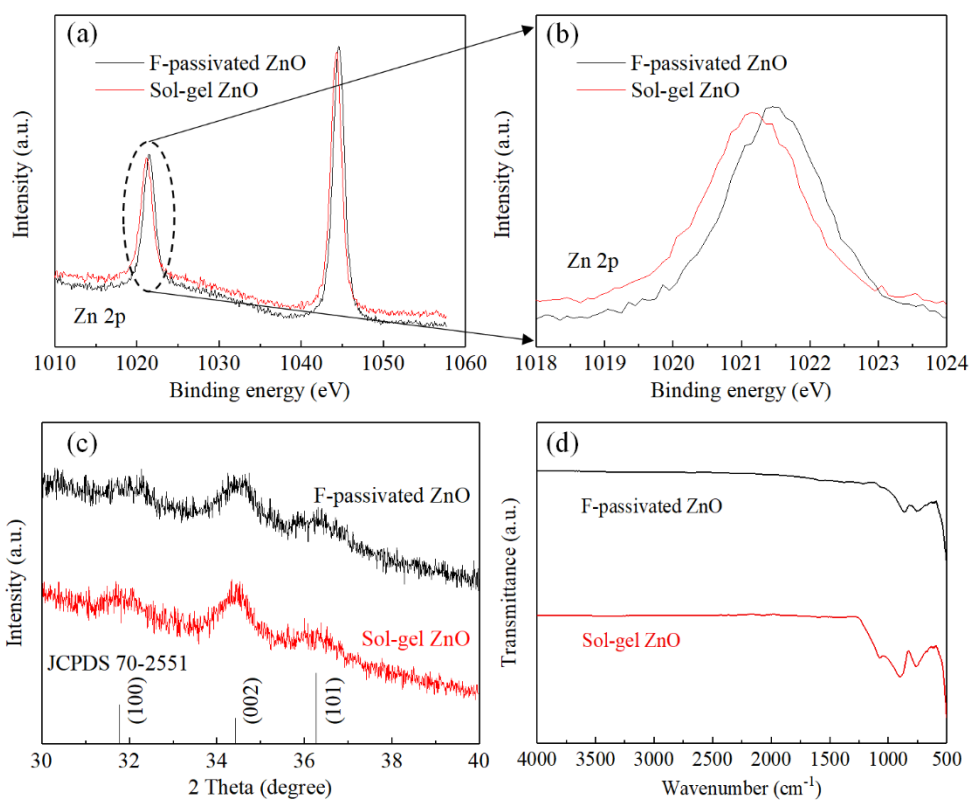


Fig. S1 (a) Zn 2p XPS of F-passivated ZnO and sol-gel ZnO. (b) Magnified Zn 2p XPS of F-passivated ZnO and sol-gel ZnO. (c) XRD patterns of ZnO with and without F passivation. (d) FTIR spectra of ZnO with and without F passivation.

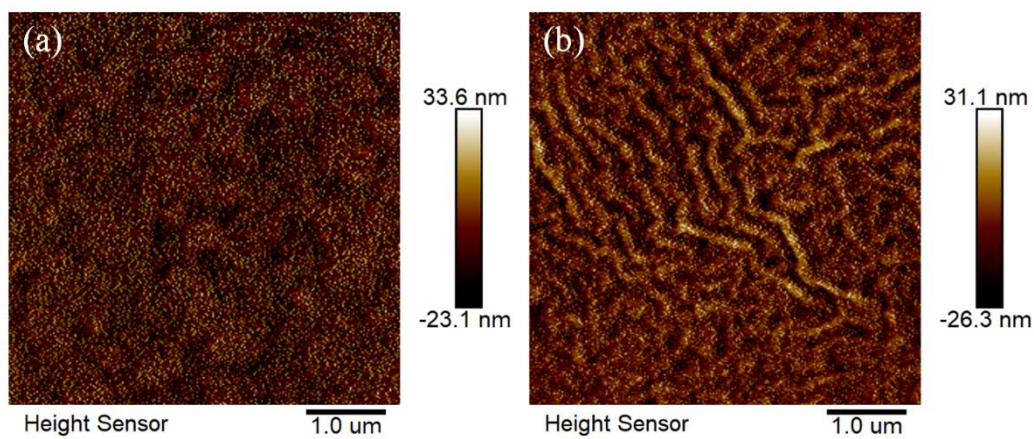


Fig. S2 Atomic force microscope characteristics. (a) F-passivated ZnO. (b) Sol-gel ZnO.

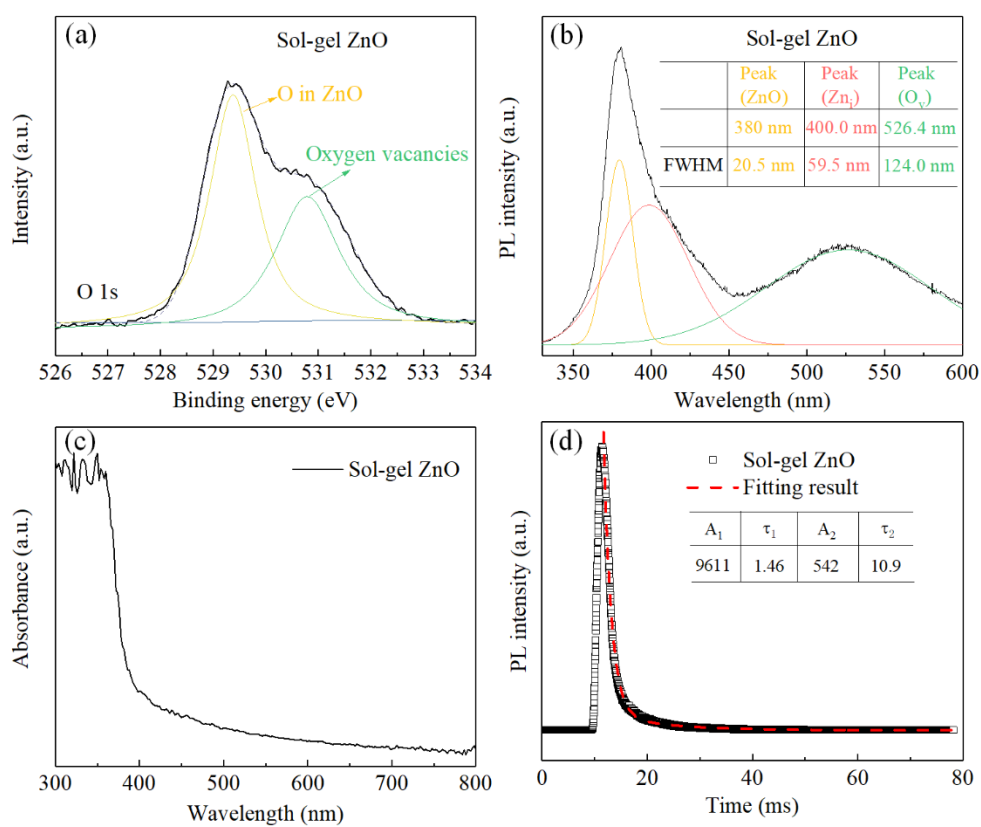


Fig. S3 (a) O 1s XPS of sol-gel ZnO. (b) PL spectra of sol-gel ZnO. The inserted table is the fitting FWHM results of ZnO defects. (c) Absorbance spectra of sol-gel ZnO. (d) Transient PL spectra of sol-gel ZnO.

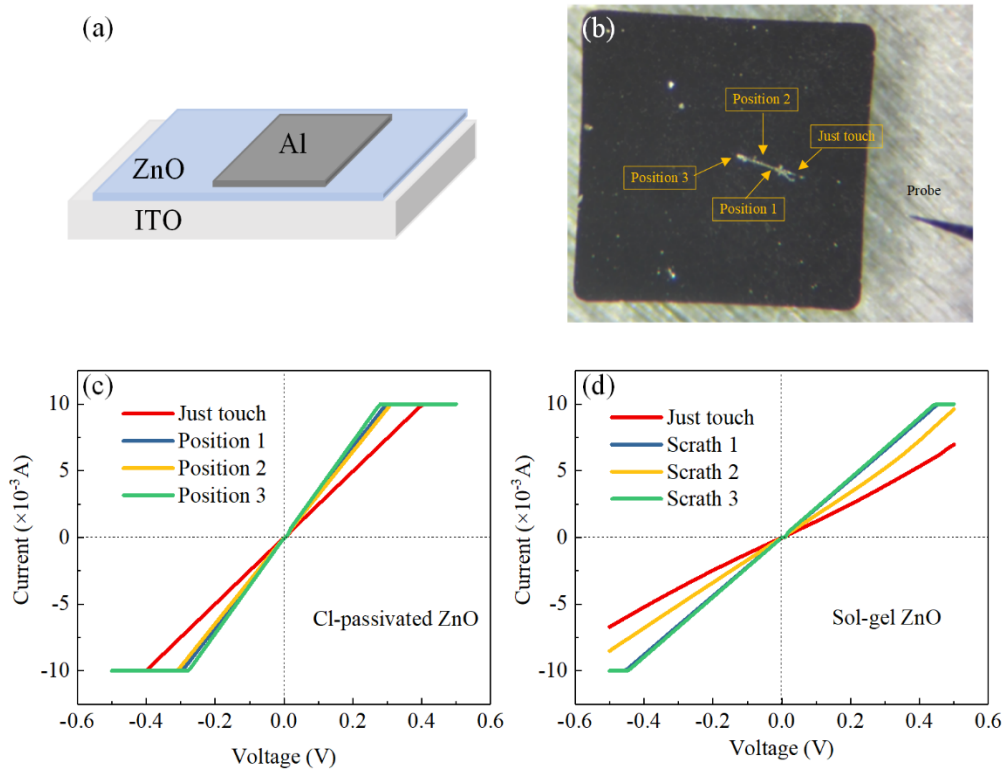


Fig. S4 (a) Schematic diagram of ZnO resistor for conductivity measurement. (b) Photograph of ZnO resistor measured at different position. (c) and (d) Current-voltage characteristics of Cl-passivated ZnO and sol-gel ZnO.

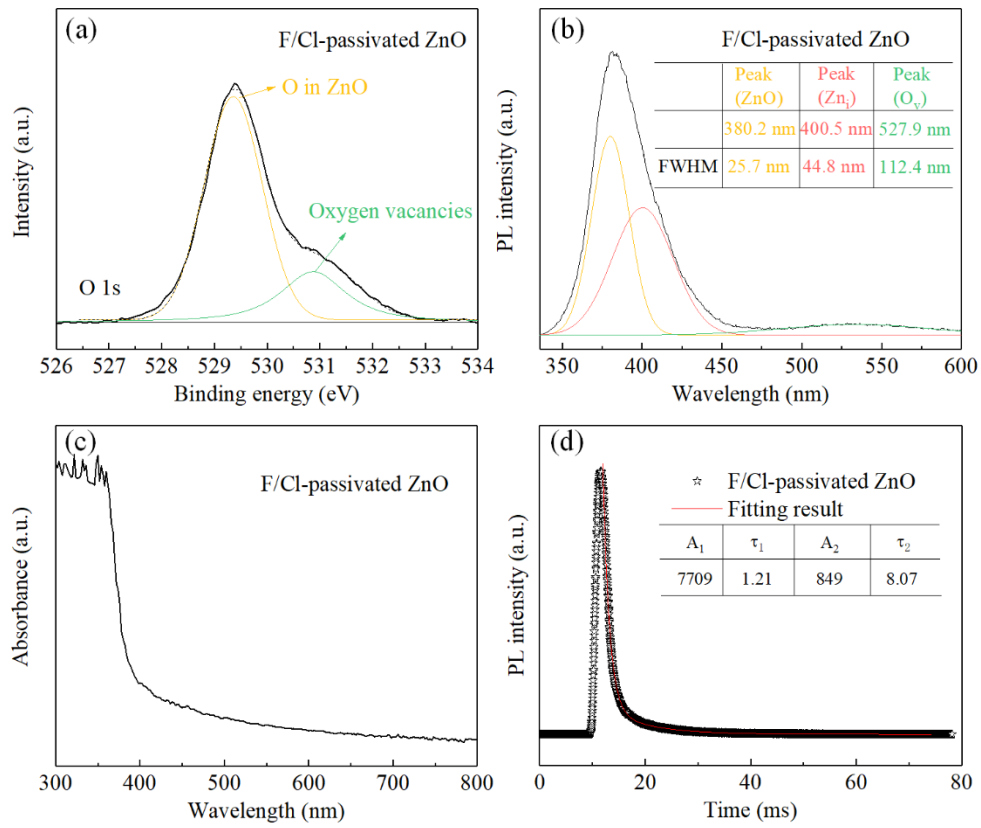


Fig. S5 (a) O 1s XPS of F/Cl-passivated ZnO. (b) PL spectra of F/Cl-passivated ZnO. The inserted table is the fitting FWHM results of F/Cl-passivated ZnO defects. (c) Absorbance spectra of F/Cl-passivated ZnO. (d) Transient PL spectra of F/Cl-passivated ZnO.

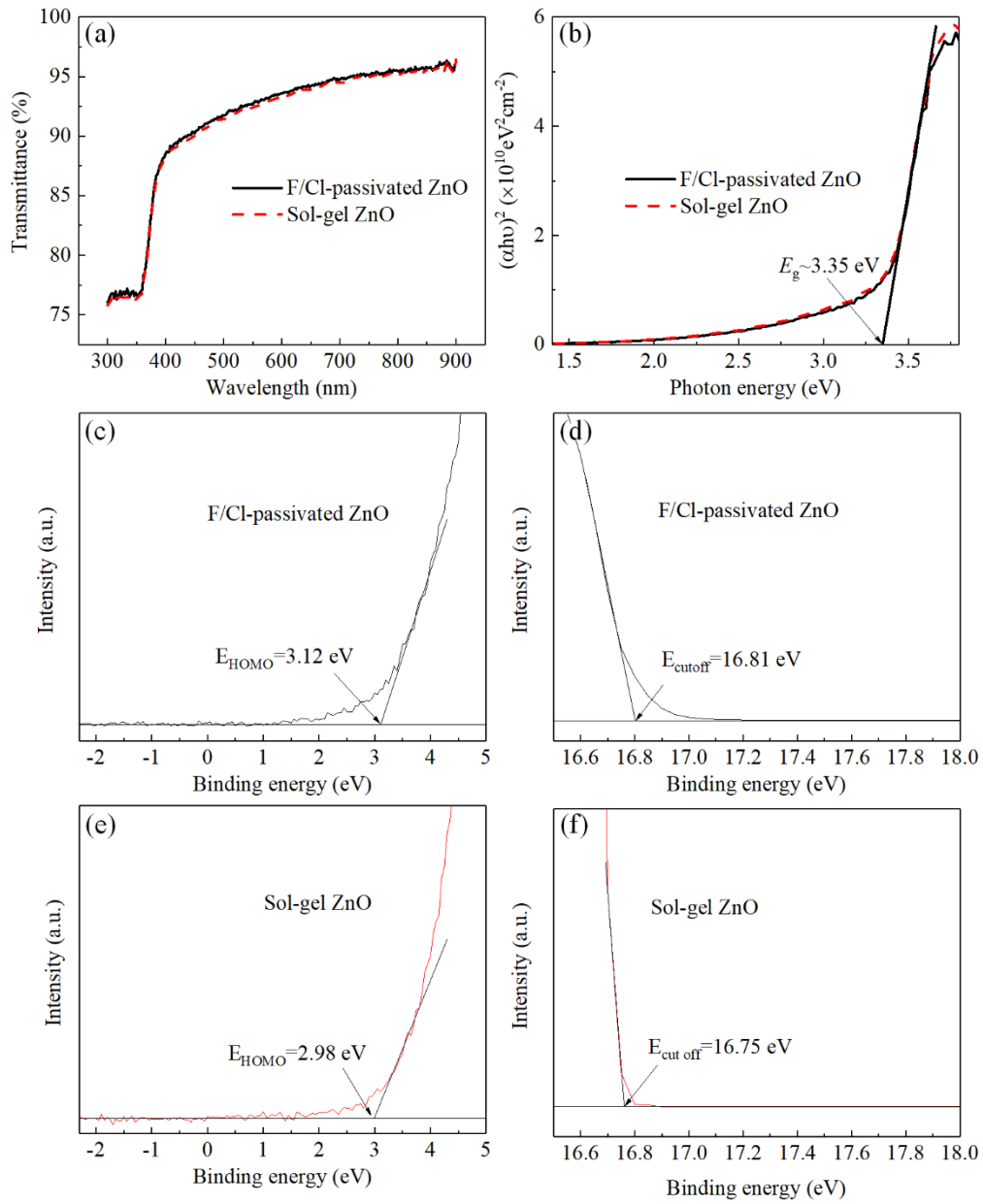


Fig. S6 Transmittance spectrum of F/Cl-passivated ZnO and sol-gel ZnO. (b) The Tauc plot of F/Cl-passivated ZnO and sol-gel ZnO. (c) and (d) Fermi level and secondary electron cutoff region of F/Cl-passivated ZnO. (e) and (f) Fermi level and secondary electron cutoff region of sol-gel ZnO.