Electronic Supplementary Information (ESI)

Polymer stabilized ZnO nanoparticles for low-temperature and solution-processed field-effect transistors

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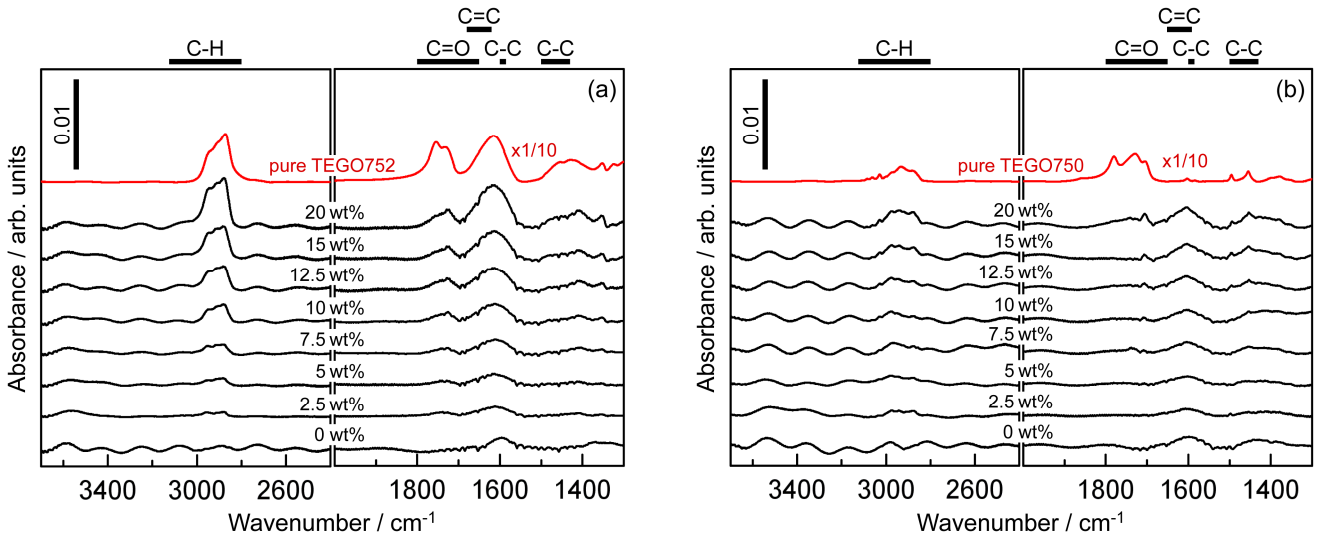
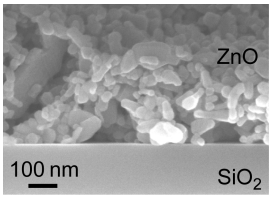
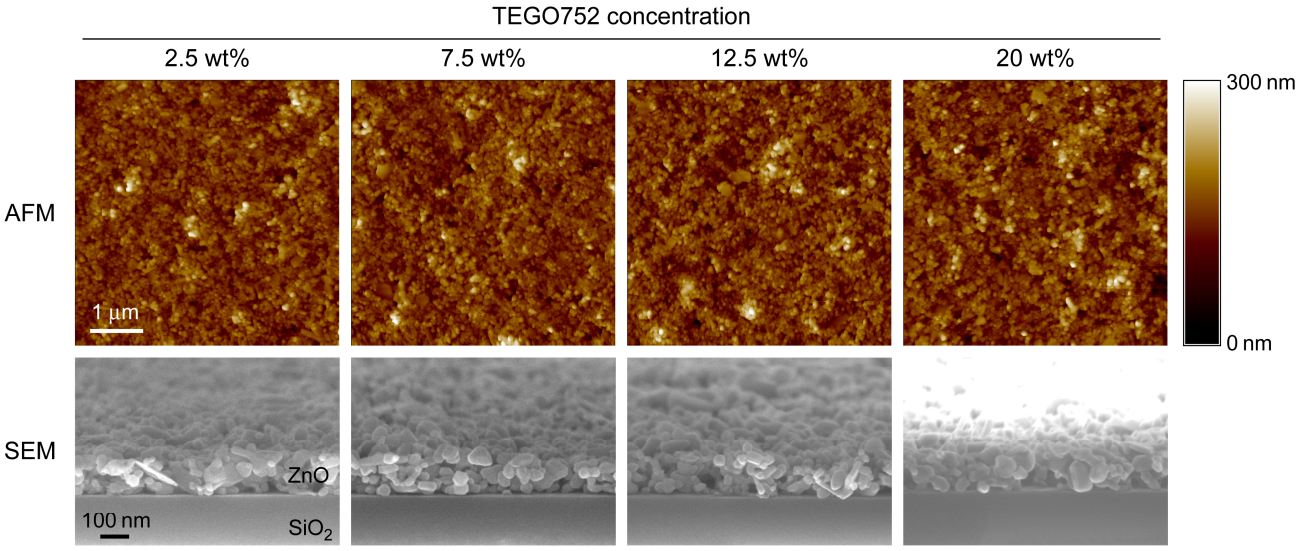


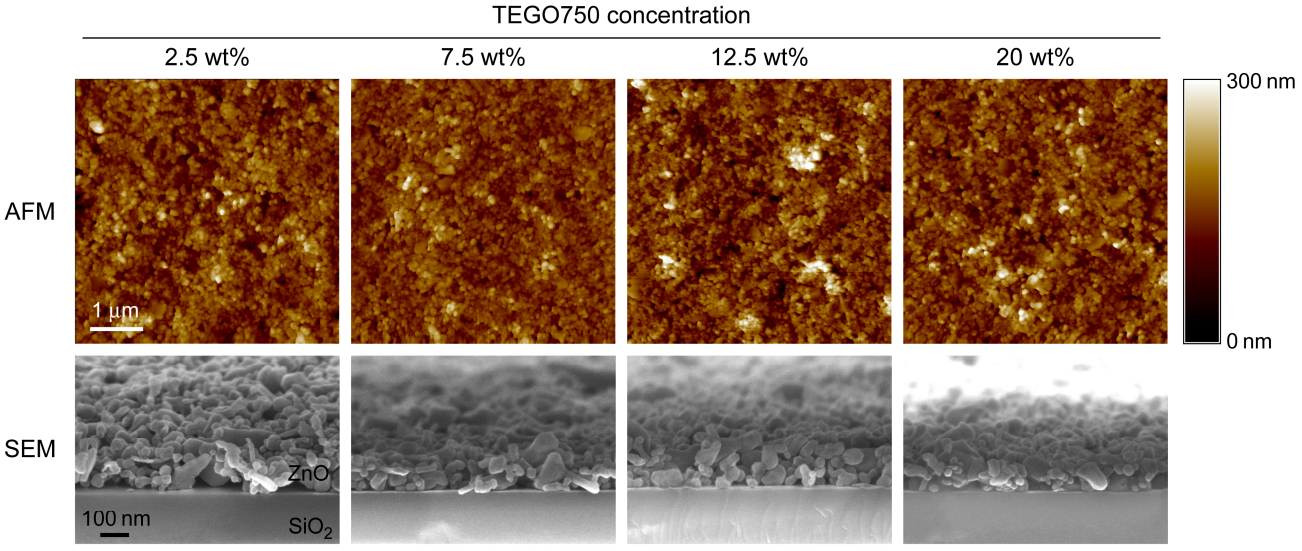
Fig. S1 (a) The infrared absorption spectra of nanoparticulate ZnO films as a function of TEGO752 concentration, spin-coated on a lightly doped *p*-type Si substrate with a thermally grown SiO_2 insulator of 200 nm thick, and baked at 150 °C in air for 60 min. The spectrum of the same Si substrate is taken as the reference spectrum. Thicknesses of the films are 598, 225, 179, 205, 204, 212, 202, and 210 nm at TEGO752 concentration of 0, 2.5, 5, 7.5, 10, 12.5, 15, and 20 wt %, respectively. The spectrum of a pure TEGO752 film is also represented on the top as a reference with the absorbance multiplied by 1/10 in all the spectra range. Each spectrum is vertically offset for clarity. (b) The infrared absorption spectra of nanoparticulate ZnO films as a function of TEGO750 concentration, prepared and arranged in the same manner as in (a). Thicknesses of the films are 607, 292, 199, 217, 200, 221, 231, and 242 nm at TEGO750 concentration of 0, 2.5, 5, 7.5, 10, 12.5, 15, and 20 wt %, respectively. The spectrum of a pure TEGO750 film is also plotted on the top as a reference with the absorbance multiplied by 1/10 in all the spectra range.



(a)



(b)



(c)

Fig. S2 (a) The cross-sectional SEM image of a nanoparticulate ZnO film without any surfactant. (b)-(c) The morphological evolution of the nanoparticulate ZnO films as a function of (b) TEGO752 concentration and (c) TEGO750 concentration, respectively, as characterized by AFM from the top and by SEM at the cross-section of the films.

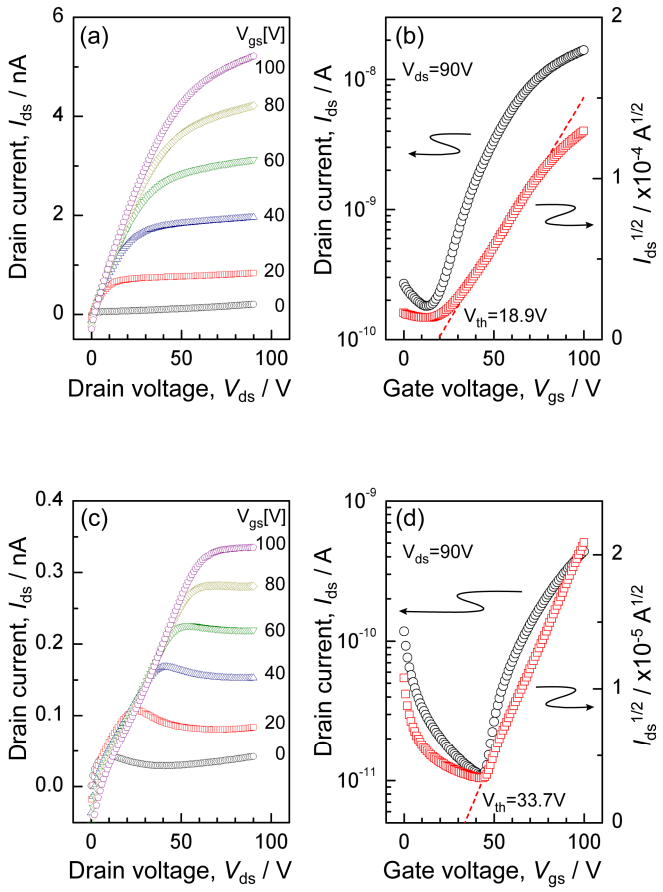


Fig. S3 (a) The output characteristics of a nanoparticulate ZnO FET with PVPh as surfactant at the concentration of 12.5 wt %. (b) The transfer characteristics of the same FET as in (a). (c) The output characteristics of a nanoparticulate ZnO FET with TEGO750 as surfactant at the concentration of 12.5 wt %. (d) The transfer characteristics of the same FET as in (c).