Printable Poly(methyl silsesquioxane) Dielectric Ink and Its Application in All Solution Processed Metal Oxide Thin-Film Transistors

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Experimental Section

For comparison, (3-aminopropyl)triethoxysilane (APTES), phenyl trichlorosilane (M1) and 1H,1H,2H,2H-perfluorodecyltrlchlorosilane(M2) was utilized to modify the IGZO surface under the same condition as GPTMS.

PMSQ-insulator TFTs were fabricated on the glass substrate using similar method as on the SiO_2 substrate. The IGZO precursor solution was spin-coated on the glass substrate and annealed at 450 ^oC in air for 60 min. The source/drain electrodes were made by thermally evaporating 120 nm thick Al onto the IGZO film via a shadow mask. Then, PMSQ layer (600 nm) was deposited by spin-coating. In the end, Al gate electrode was thermally evaporated on top of the PMSQ film to complete device stacks.

For the transmittance measurement, the IGZO and PMSQ was deposited by spin-coating, and annealed at 450 and 200 ^oC in air, respectively.

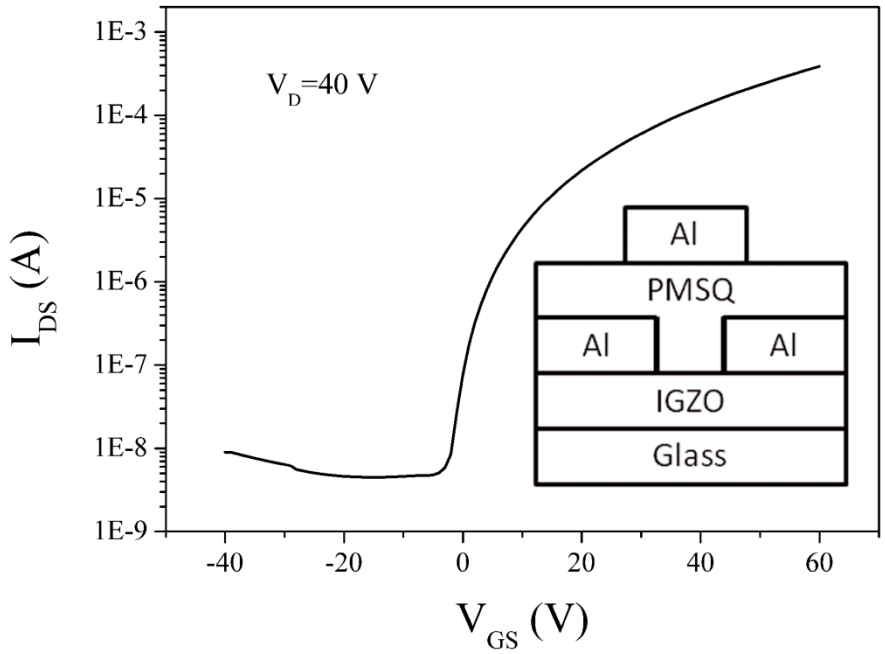

Figure S1 Transfer characteristics of IGZO TFTs with spin-coated PMSQ dielectric layer cured at temperature of 200 ^oC on the glass substrate.
(The insert image is the schematic cross-sectional view of a fabricated top-gate, top-contact PMSQ-insulator IGZO TFT).

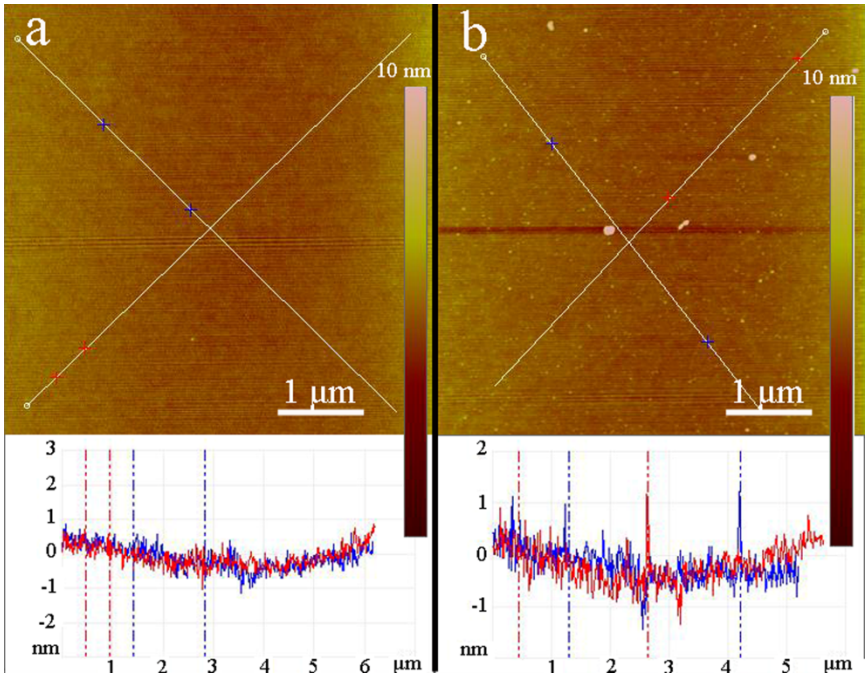

Figure S2 AFM images of (a) IGZO (b) GPTMS modified IGZO film

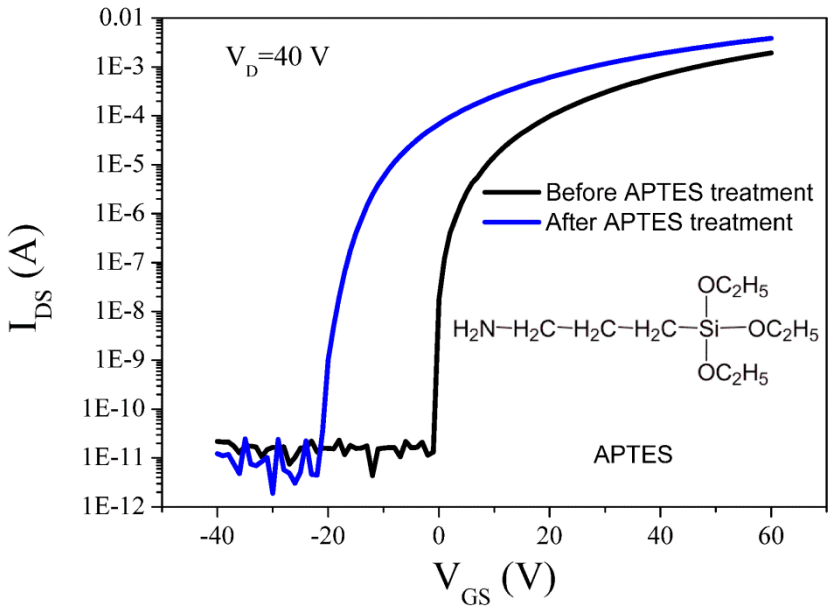

Figure S3 Transfer characteristics of SiO_2-substrate IGZO TFTs before and after the APTES treatment.

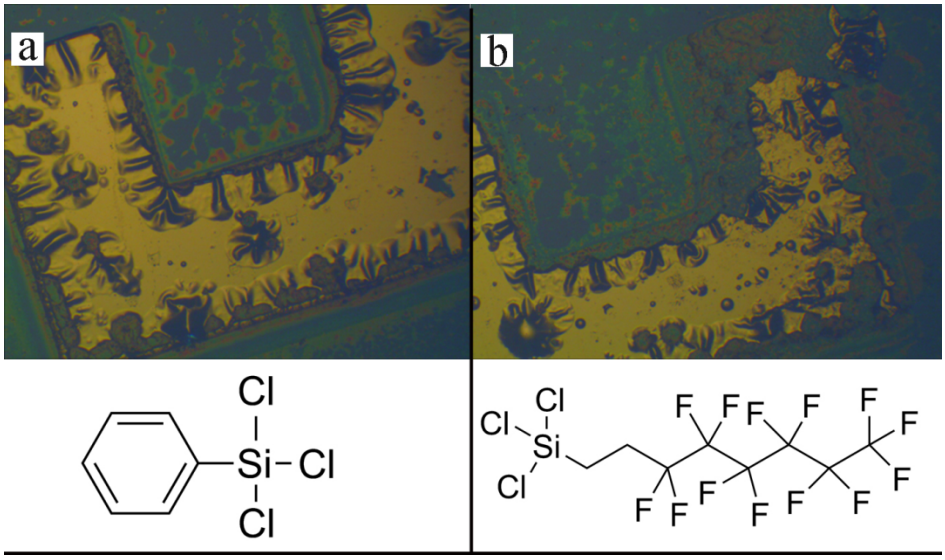

Figure S4 Photos of IGZO TFTs modified by (a) phenyl trichlorosilane, (b) 1H,1H,2H,2H-perfluorodecyltrlchlorosilane.

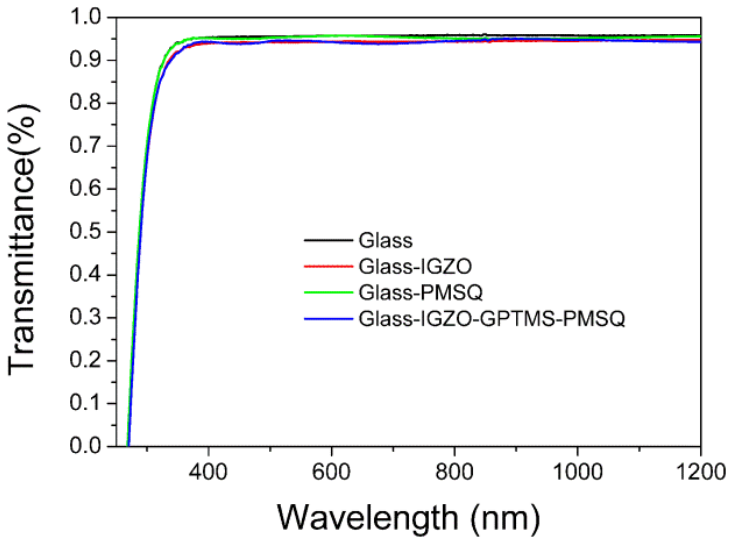

Figure S5 The transmittance spectra of glass, glass/IGZO, glass/PMSQ and glass/IGZO/GPTMS/PMSQ