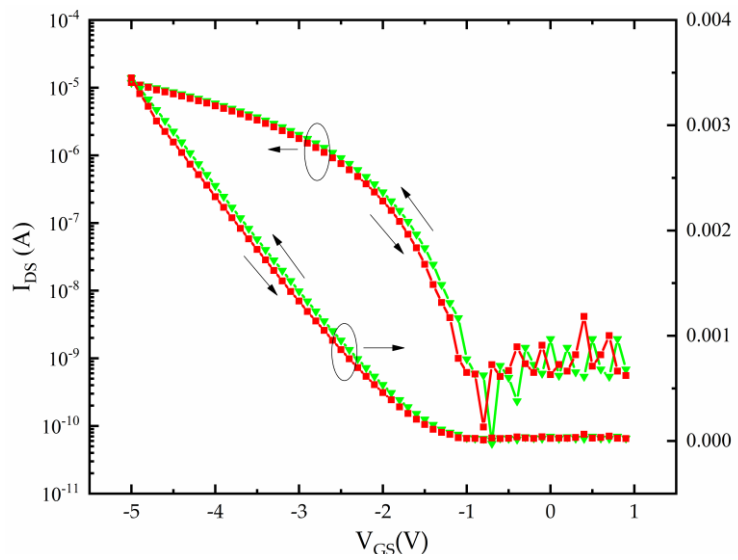
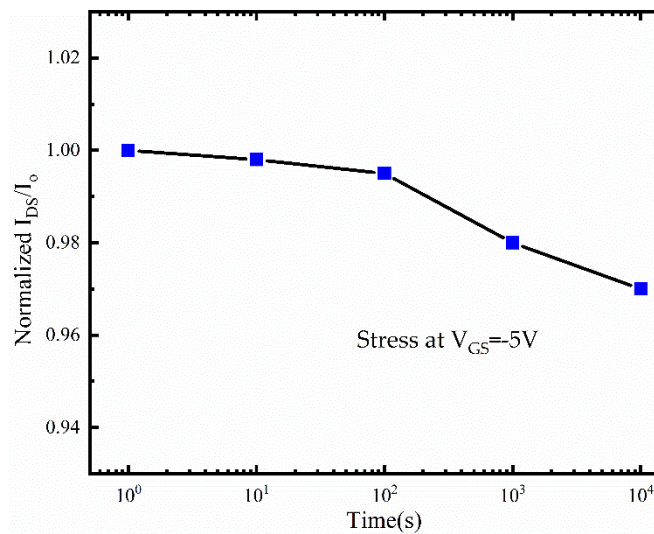


**Figure S1.** The leakage current of the OTFTs based on various dielectric layer by applying the gate voltage from 1 to  $-5\text{V}$ .



**Figure S2.** The hysteresis characteristic of OTFT device with improved sol-gel  $\text{SiO}_x/\text{PVP}$  dielectric layer.



**Figure S3.** The normalized D/S current of OTFT device with improved Sol-gel  $\text{SiO}_x/\text{PVP}$  dielectric layer when constant bias stress  $V_{GS} = -5\text{V}$  is applied for more than 3 h.