Supplemental Document

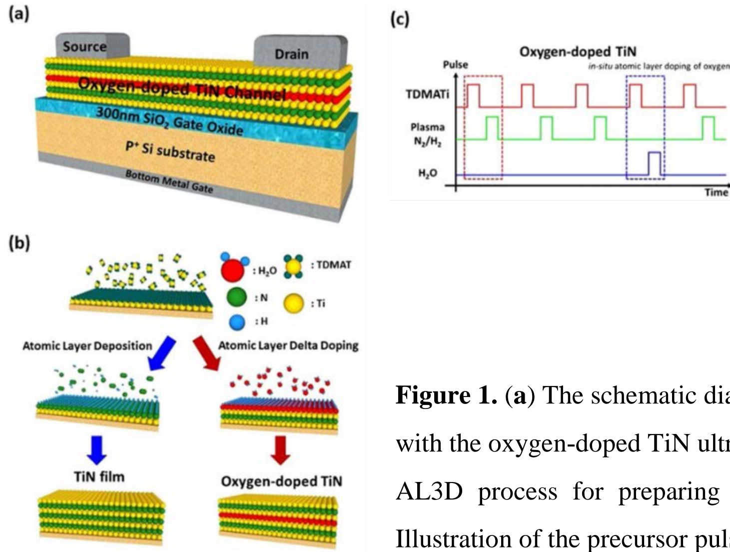

Figure 1. (**a**) The schematic diagram of the bottom-gated metallic channel transistors with the oxygen-doped TiN ultrathin-body channel. (**b**) The schematic diagram of the AL3D process for preparing the oxygen-doped TiN ultrathin-body channel. (**c**) Illustration of the precursor pulse as a function of time in the AL3D process.

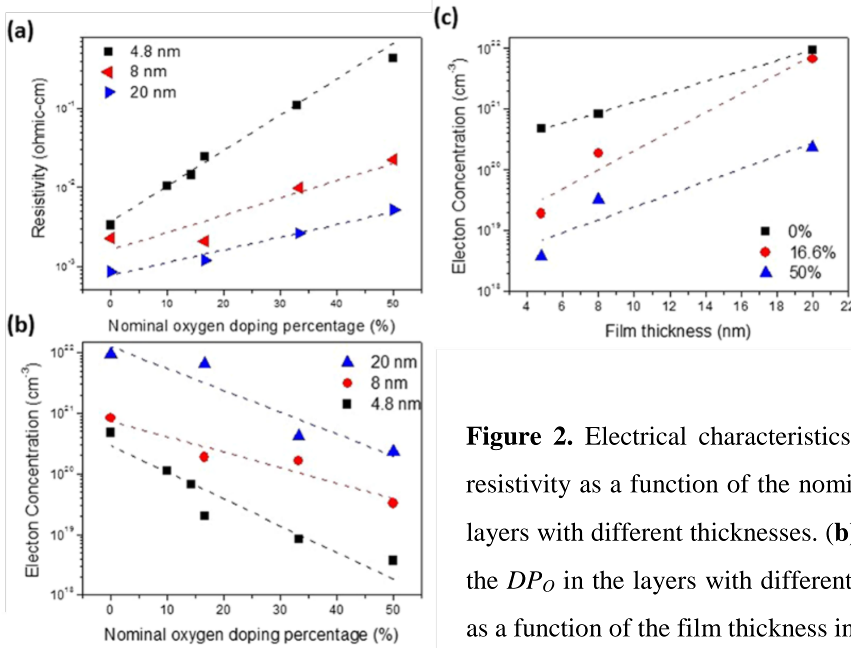

Figure 2. Electrical characteristics of the oxygen-doped TiN layers. (**a**) The resistivity as a function of the nominal oxygen doping percentage (DP_O) of the layers with different thicknesses. (**b**) The electron concentration as a function of the DP_O in the layers with different thicknesses. (**c**) The electron concentration as a function of the film thickness in the layers with different DP_O.

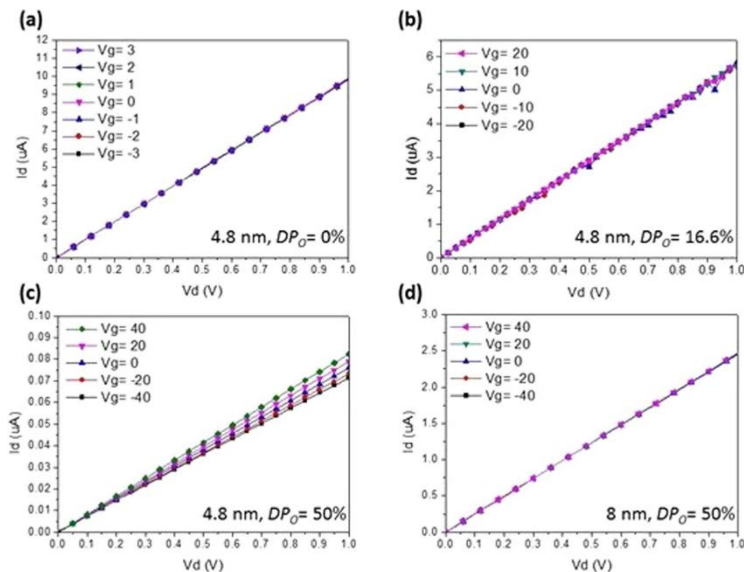

Figure 3. Room-temperature I_d-V_d characteristics at various bottom gate voltages (V_g) of metallic channel transistors with the oxygen-doped TiN ultrathin-body channel. (**a**) 4.8 nm TiN-based channel with the nominal oxygen doping percentage (DP_O) of 0%. (**b**) 4.8 nm TiN-based channel with the DP_O of 16.6%. (**c**) 4.8 nm TiN based channel with the DP_O of 50%. **(d)** 8 nm TiN-based channel with the DP_O of 50%.