

Supplementary Information

“Sub-10 nm scalable hybrid dielectric engineering on MoS₂ for 2D materials based devices”

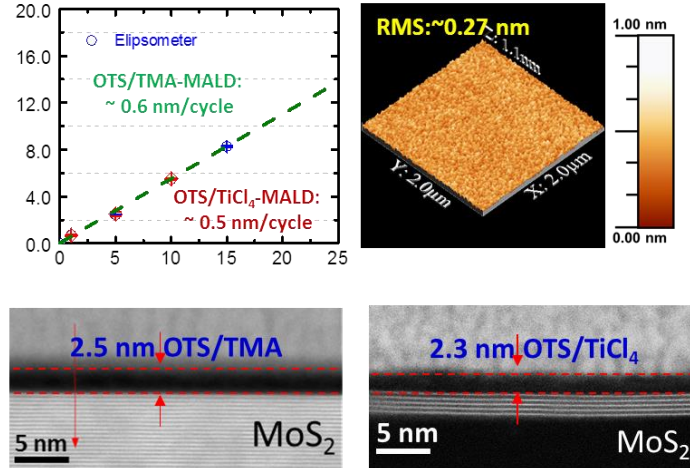


Figure S1: MALD hybrid OTS-Al₂O₃ and OTS-TiO₂ films show constant growth rate of ~0.5 nm/cycle with excellent film uniformity (Top) and thickness scalability down to 2.5 nm on MoS₂ as verified by HR-TEM cross-section images.

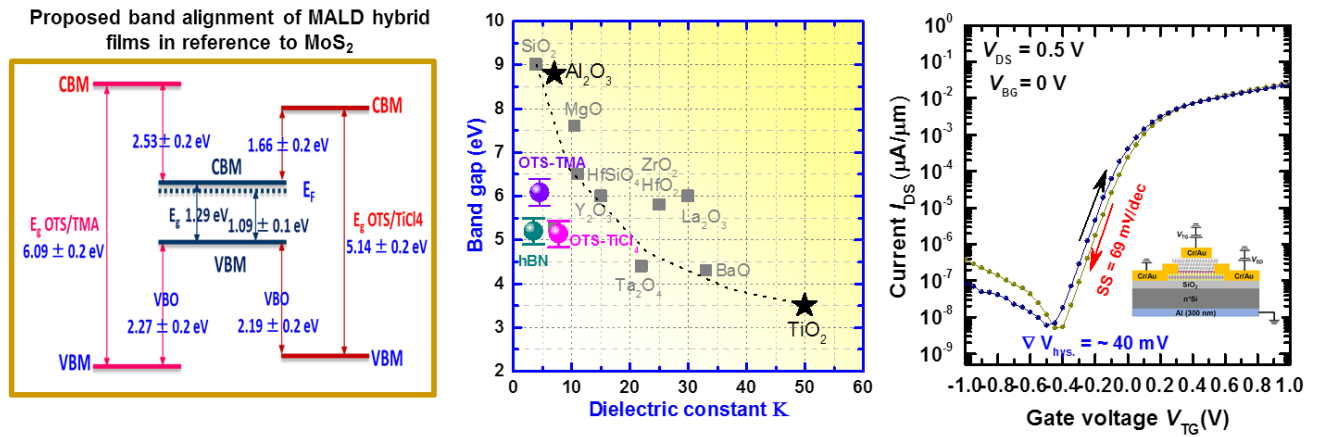


Figure S2: Proposed band alignments of OTS/TMA and OTS/TiCl₄ hybrid dielectrics in reference to MoS₂ extracted based on their XPS valence band and O 1s loss features (left). Tunable dielectric constant from 4.5 to 7.8 by changing the inorganic component from Al-O to Ti-O (middle). Top gate modulation of MoS₂ devices with 7.0 nm of OTS/TMA as dielectric (right).