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Electronic Supporting Information for

Optimized Al-doped TiO_2 gate insulator for metal-oxide-semiconductor capacitor on Ge substrate

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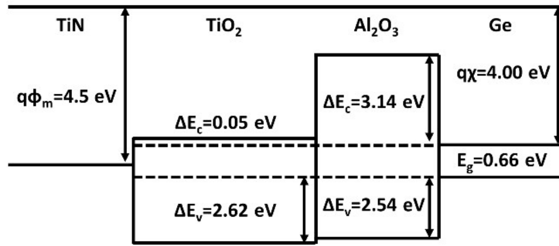


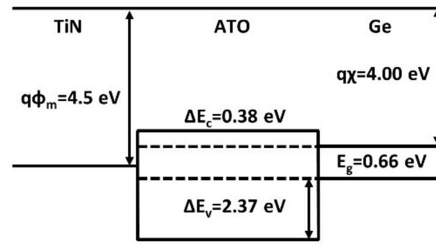


Figure S1. The band alignment in flat band condition of (a) Pt/TiN/TiO_2/Al_2O_3/Ge capacitor, (b) Pt/TiN/ATO/Ge capacitor

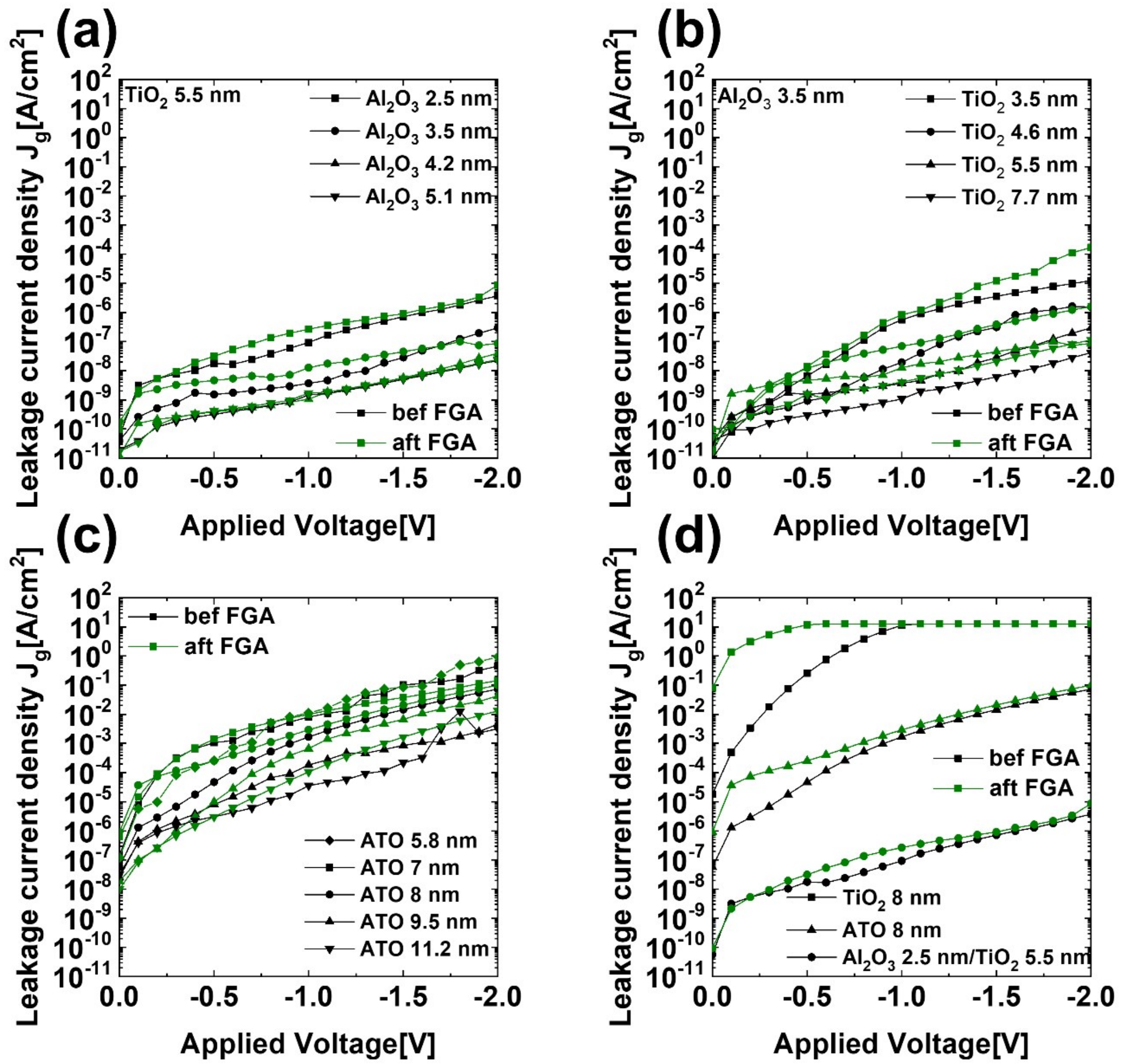
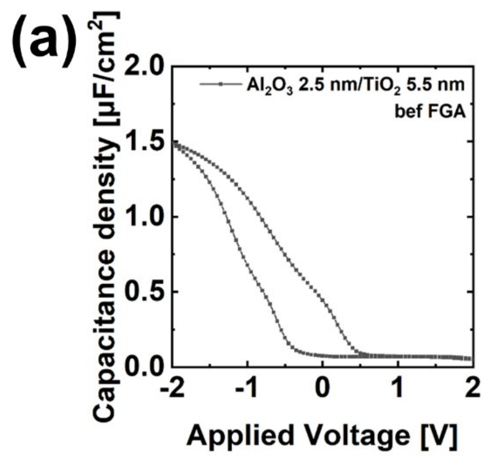
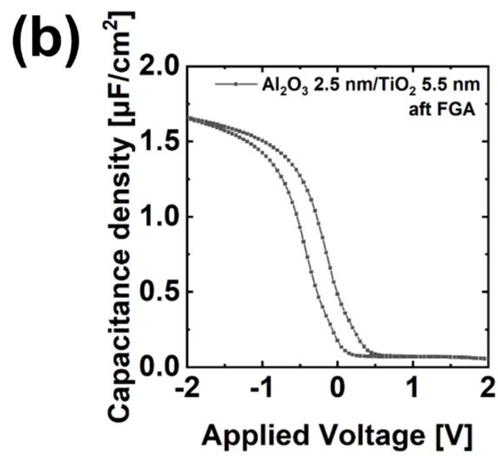
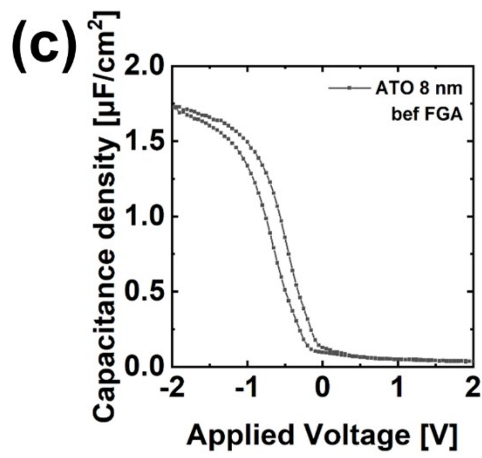


Figure S2. Leakage current characteristics of (a) Pt/TiN/5.5-nm-thick TiO_2/2.5, 3.5, 4.2, and 5.1-nm-thick Al_2O_3/Ge capacitors, (b) Pt/TiN/3.5, 4.6, 5.5, and 7.7-nm-thick TiO_2/3.5-nm-thick Al_2O_3/Ge capacitors, (c) Pt/TiN/5.8, 7, 8, 9.5, and 11.2-nm-thick ATO/Ge capacitors, (d) Pt/TiN/8-nm-thick TiO_2, ATO and 5.5-nm-thick TiO_2/2.5-nm-thick Al_2O_3/Ge capacitors before and after FGA







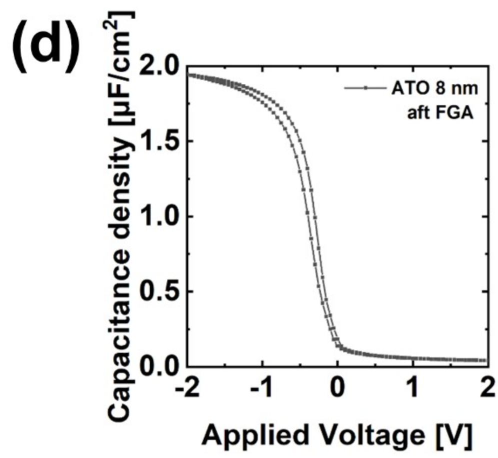


Figure S3. Capacitance voltage characteristics(measured at 100 kHz/130 K**)** of (a),(b) Pt/TiN/5.5-nm-thick TiO_2/2.5-nm-thick Al_2O_3/Ge capacitors before and after FGA (c),(d) Pt/TiN/8-nm-thick ATO/Ge capacitors before and after FGA