

Impact of TiN Metal Gate Deposition Process on Oxygen-Vacancy-Related Defects and Electrical Characteristics of HfO₂-Based Gate Stacks

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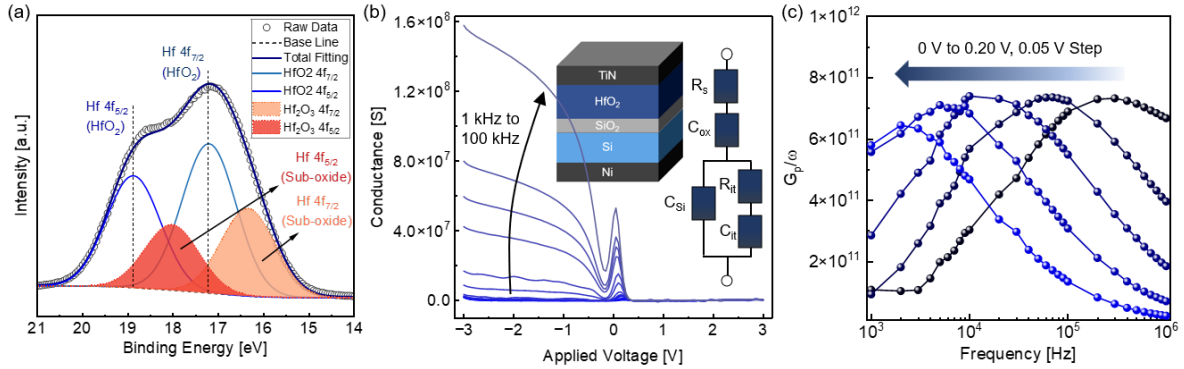


Figure 1. (a) XPS Hf 4f core-level spectra of the TiN/HfO₂ interface, measured to evaluate the interfacial state formed during top TiN metal deposition. (b) Conductance (G) plots extracted from multi-frequency C–V measurements of HKMG MOSCAPs with different TiN metals, performed to assess film reliability. (c) Corresponding G_p/ω versus frequency plots, from which the interface trap density (D_{it}) is extracted. The G_p/ω peak shifts toward lower frequencies with increasing applied bias, reflecting the frequency-dependent response of interface traps.

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