

Abstract

Ge MOS Characteristics with CVD HfO₂ Gate Dielectrics and TaN Gate Electrode

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In this paper, we report for the first time Ge MOS characteristics with ultra thin rapid thermal CVD HfO₂ gate dielectrics and TaN gate electrode. Using the newly developed pre-gate cleaning and NH₃-based Ge surface passivation, the TaN/HfO₂/Ge gate stack with EOT of 12.9Å exhibits excellent leakage current density of 6mA/cm² @V_g=1V and interface state density (D_{it}) of 8x10¹⁰/cm²-eV. Both D_{it} and CV hysteresis of Ge MOS are improved significantly with NH₃ surface treatment. We also study the effects of post-deposition anneal and investigate the conduction mechanism of TaN/HfO₂/Ge gate stack.