Self-Aligned Ultra Thin HfO_2 CMOS Transistors with High Quality CVD TaN Gate Electrode

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In this paper, we have demonstrated and characterized self-aligned, gate-first CVD TaN gate n- and p-MOS transistors with ultra thin (EOT=11~12Å) CVD HfO_2 gate dielectrics. These transistors show no sign of gate deletion and excellent thermal stability after 1000ºC, 30s N_2 anneal. Compared with PVD TaN devices, the CVD TaN/HfO_2 devices exhibit lower leakage current, smaller CV hysteresis, superior interface properties, higher transconductance, and superior electron and hole mobility.