High-k TiCeO MIM Capacitors with a Dual-Plasma Interface Treatment

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Abstract

In this study, we successfully fabricated high-k Ir/TiCeO/TaN metal–insulator–metal (MIM) capacitors using a dual-plasma treatment on a bottom TaN electrode. The plasma treatment suppressed the growth of the bottom interfacial layer to largely improve capacitor performance at a 400°C thermal budget. The Ir/TiCeO/TaN MIM capacitor achieved a high capacitance density of ~17 fF/um2 at a 22 nm thickness and a low quadratic coefcient of capacitance (VCC-) of 866 ppm/V2ata10.3 fF/um2 density. The good performance is due to the combined effects of a dual-plasma interface treatment, higher-k TiCeO dielectrics, and a high work-function Ir metal.

Keyword：MIM Capacitor