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Capacitive dependence on the thickness of silicon dioxide films grown by Atomic Layer deposition on silicon substrates using Tris (Dimethyl Amino) Silane (TDMAS) and Ozone[1] EKEMBU KEVIN TANYI, SANGRAM K. PRADHAN[2], ASWINI PRADHAN[3], Norfolk State University —

ALD of SiO_2 using Tris (Dimethyl Amino) Silane has been reported in a number of research articles using this same precursor as well as water, hydrogen peroxide or ozone. SiO_2 is used widely in manufacture of MOS capacitors and MOS transistors where the quality of oxide formed is of utmost importance. In this comprehensive study, we fabricated MOS-Capacitors by patterning thin films of SiO_2 grown by ALD at 200 °C on silicon substrates with front and back chromium metal contacts. The electrical characteristics were investigated for different film thicknesses ranging from 1 to 40 nm. The thicknesses of the films were measured using the EOT calculations. These were then compared to thickness measurements made with Ellipsometry and the mismatch is reported here. Published here are also the X-Ray Diffraction and Raman Spectroscopy results. What makes our data unique is that, we also provide valuable information, often missing in key fabrication process using ALD system for process compatibility. The effects of the choice of metal used on the electrical results as well as the effects of thermal processing have been explored for the high performance on the final characteristics of these MOS capacitors.

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