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Thermal stability and interfacial properties of $\text{ZrAl}_x\text{Si}_y\text{O}_z$ films prepared by pulse-laser deposition in high vacuum XIAOYAN QIU, Nanjing National Laboratory of Microstructures, Nanjing University & Institute of Physics, Southwest University, HONGWEI LIU, JUNMING LIU¹, Nanjing National Laboratory of Microstructures, Nanjing University — The thermal stability and interfacial properties of $\text{ZrAl}_x\text{Si}_y\text{O}_z$ film prepared by pulse-laser deposition (PLD) in high vacuum have been investigated. X-ray diffraction (XRD) and differential scanning calorimeter (DSC) investigation show that the crystallization temperature of $\text{ZrAl}_x\text{Si}_y\text{O}_z$ film is above 900 ° C. A dielectric constant of 12.9(at 1MHz) is obtained by measuring a Pt/ $\text{ZrAl}_x\text{Si}_y\text{O}_z$ /Pt structure. High-resolution transmission electron microscopy (HRTEM) and X-ray photon spectroscopy (XPS) analyses reveal that an amorphous Zr-silicide interfacial layer is formed at 700 ° C, but Pt/ $\text{ZrAl}_x\text{Si}_y\text{O}_z$ /Zr-silicide/Si capacitors still have good electrical properties, such as small equivalent oxide thickness of 0.5nm, flat band voltage of 0.43V and low leakage current density of 2.76mA/cm² at 1V gate voltage.

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