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Non-volatile Memory Behaviors of $Al_2O_3/Cu/Al_2O_3$ Multi-layers prepared by ALD

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In this study, $Al_2O_3/Cu/Al_2O_3$ multi-layers were fabricated using atomic layer deposition (ALD) technique on p-type Si(001) in order to investigate the floating gate memory characteristics. Al_2O_3 thin films, as control layer and tunneling layer, were grown using TMA $\{Al(CH_3)_3\}$ and H_2O and Cu layers, as a charge-stored layer, were prepared using Cu aminoalkoxide precursor with hydrogen plasma. The films were characterized by XPS, AFM, and SEM, etc depending on the surface preparations and deposition conditions. Non-volatile memory behaviors of $Al_2O_3/Cu/Al_2O_3$ multi-layers were recognized by high frequency capacitance-voltage (C-V) measurements.