Novel Plasma Enhanced Atomic Layer Deposition Technology for High-k Capacitor with EOT of 8Å on Conventional Metal Electrode

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We have developed a plasma enhanced atomic layer deposition(PEALD) technology for high-k dielectrics such as Al2O3,Ta2O5 and HfO2. Film quality and throughput of PEALD are far superior to that of ALD which has been spotlighted as a deposition technology for next generation semiconductor devices. We have obtained a extremely low equivalent oxide thickness(EOT) of 8Å from HfO2 film, which has not been reported in conventional metal-based memory capacitors up to now. It was confirmed that PEALD-Al2O3 and Ta2O5 films are superior to those using any other deposition techniques and very useful as System-on-Chip(SoC) capacitors.