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## Memory Characteristics of High Density Self-assembled FePt Nano-dots Floating Gate with High-k Al<sub>2</sub>O<sub>3</sub> Blocking Oxide

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In this letter, We have investigated cell characteristics of the alloy FePt-NDs charge trapping memory capacitors with high-k Al<sub>2</sub>O<sub>3</sub> dielectrics as a blocking oxide. The capacitance versus voltage (C-V) curves obtained from a representative MOS capacitor embedded with FePt-NDs synthesized by the post deposition annealing (PDA) treatment process exhibit the window of flat-band voltage shift, which indicates the presence of charge storages in the FePt-NDs. It is shown that NDs memory with high-k Al<sub>2</sub>O<sub>3</sub> as a blocking oxide has performance in large memory window and low leakage current when the diameter of ND is below 2 nm. Moreover, high-k Al<sub>2</sub>O<sub>3</sub> as a blocking oxide increases the electric field across the tunnel oxide, while reducing the electric field across the blocking layer. From this result, this device can achieve lower P/E voltage and lower leakage current. As a result, a FePt-NDs device with high-k Al<sub>2</sub>O<sub>3</sub> as a blocking oxide obtained a~7V reduction in the programming voltages with 7.8 V memory.

**Keywords:** High-k material, Nano dot