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1. Publishable summary

Metal-FE-metal (MFM) capacitors are an important building block for embedded FE memories. Placed in the BEoL, they can be connected to the gate contact of a standard FEoL logic device to realize 1T1C FE field effect transistors (FeFETs), as depicted in Figure 1. In a 1T1C FeFET, the polarization stored in the BEoL MFM structure modulates the surface potential of the channel, which, in turn, impacts the threshold voltage (Vt) of the transistor. Readout is done non-destructive by sensing the drain current at gate voltages significantly below |Ec|. Herein, BEoL MFM capacitors, 1T1C FeFET memory cells, and 1T1C FeFET memory arrays are fabricated and characterized. In addition, strategies to improve the programming voltage, memory window (MW) size, and endurance are deduced.

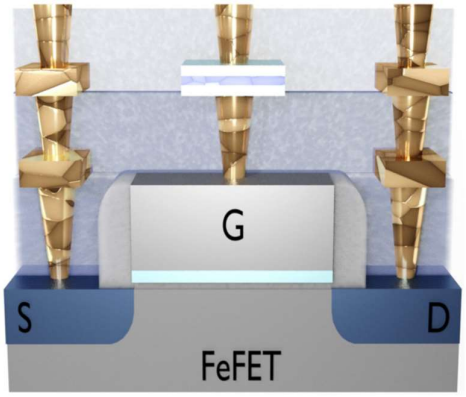

Figure 1: Simplified schematic showing an MFM capacitor placed in the BEoL of a microchip that is connected to the gate contact of a standard FEoL logic device to realize a 1T1C FeFET memory cell [11].