Supporting Information

Electrical-field-driven metal-insulator transition tuned with self-aligned atomic defects

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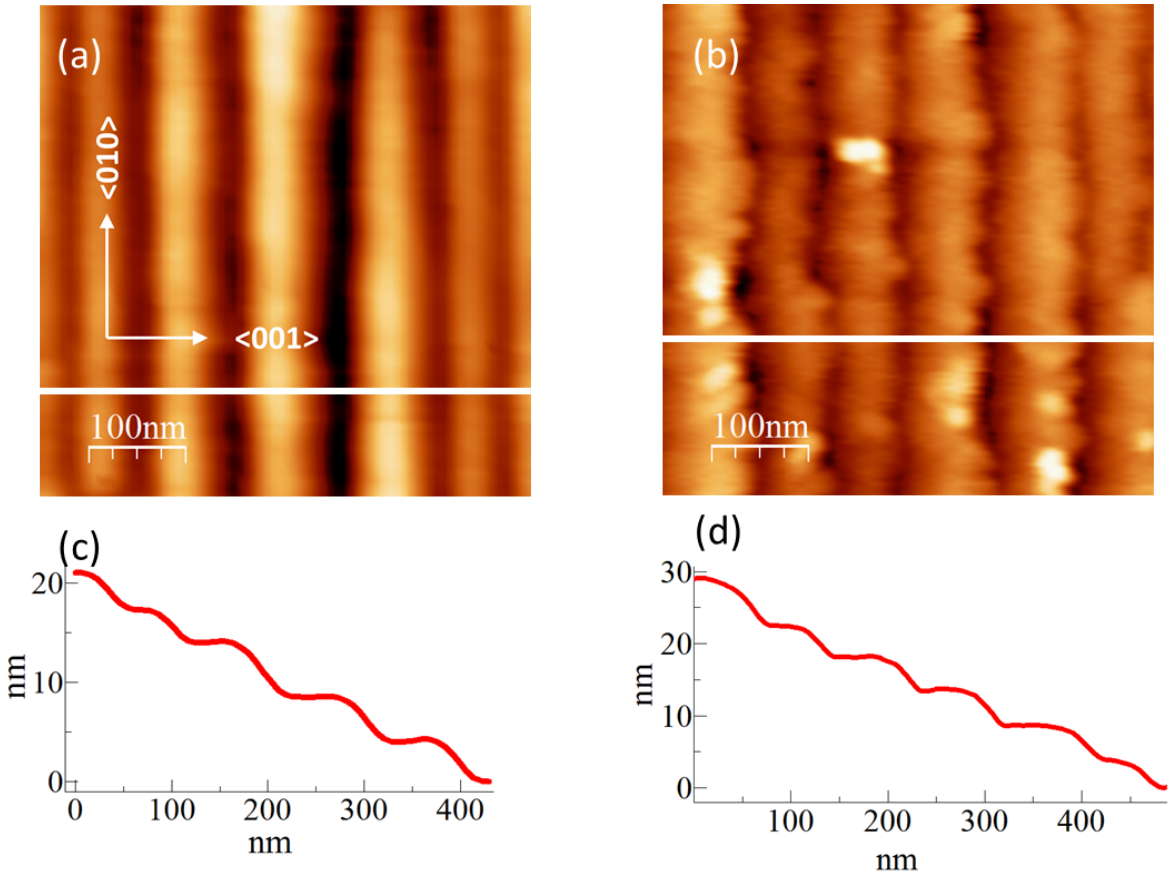

Figure S1. (a) AFM image of a $SrTiO_3$ substrate with a miscut angle of 3° annealed at 1130°C for 3 h (b) AFM image of 95 nm thick Fe_3O_4 deposited on a stepped $SrTiO_3$ substrate. (c) and (d) are the corresponding height profile for $SrTiO_3$ substrate and for 95 nm thick Fe_3O_4 deposited on a stepped $SrTiO_3$ substrate respectively.

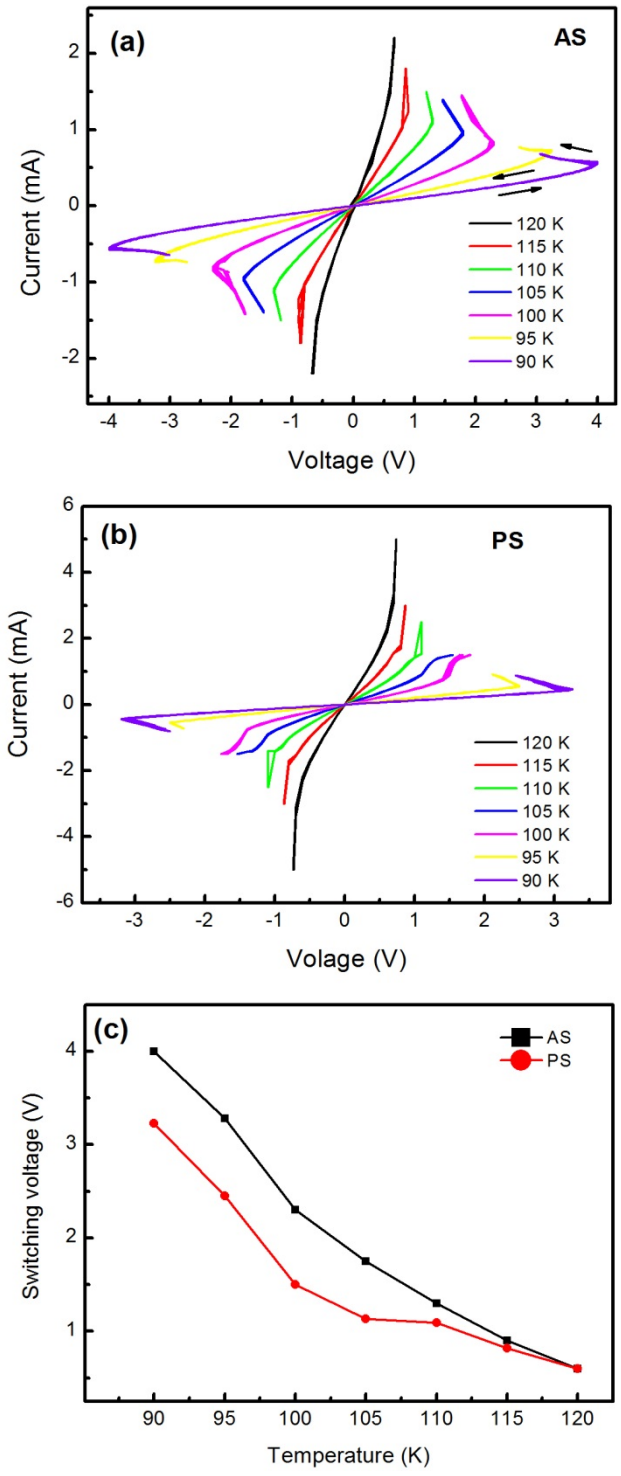

Figure S2: I-V measurements for another 100 nm thick Fe_3O_4 film on a stepped $SrTiO_3$ substrate with a temperature range between 120K – 90K, for devices with four probe electrodes in PS (a) and AS (b) configurations. (c) Difference in the switching on voltage for the electric field applied along the steps and perpendicular to steps.

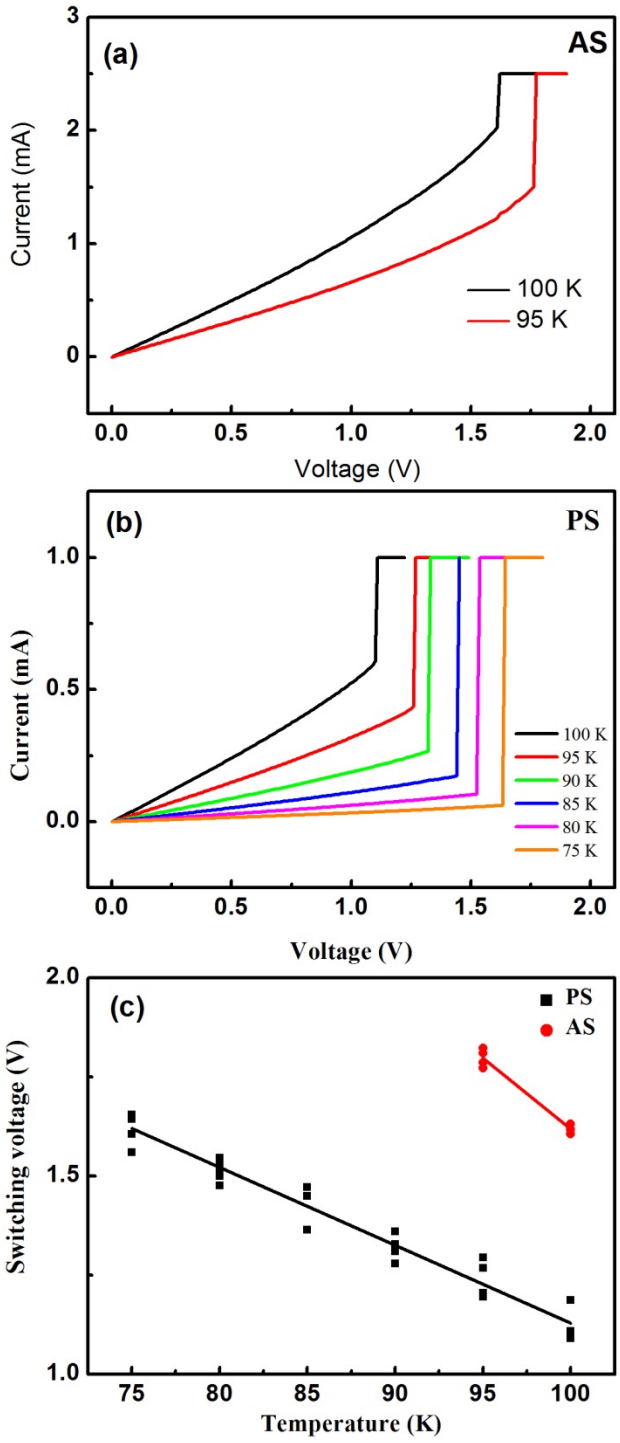

Figure S3: I-V measurements for a 60 nm thick Fe_3O_4 film on a stepped MgO substrate with a temperature range between 120K – 90K, for devices with four probe electrodes in PS (a) and AS (b) configurations. (c) Difference in the switching on voltage for the electric field applied along the steps and perpendicular to steps.

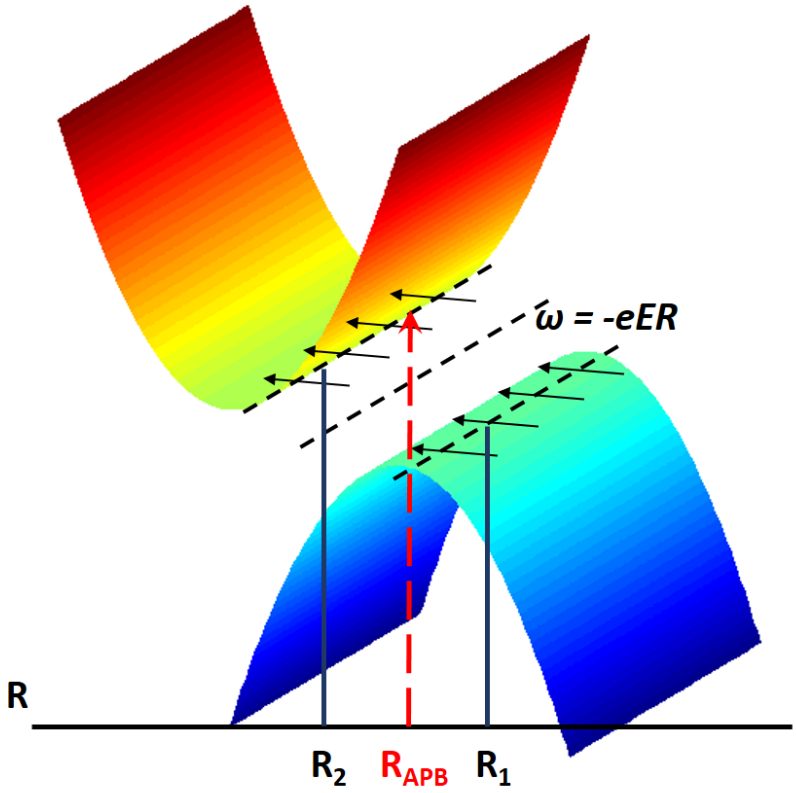

Figure S4: Schematic drawing of the band structure of Fe_3O_4 with APBs under an electrical field of E.