Supplementary Information for:

Metal-Driven Interface Engineering Enables Multi-functionality in $SrTiO_3$ Memristor Devices

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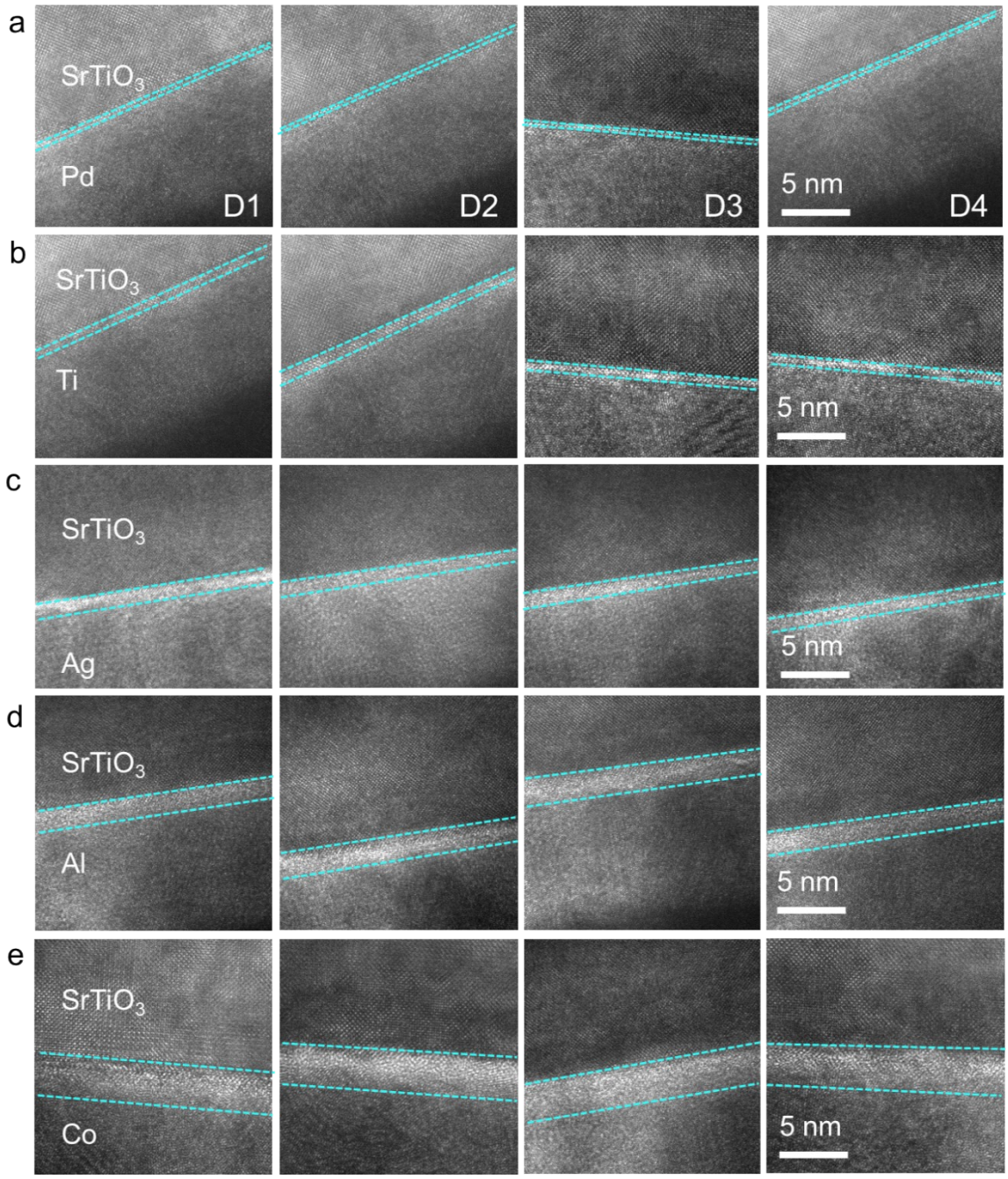

Figure S1. Cross-sectional HAADF-STEM images of metal/$SrTiO_3$ show the interfacial width. In each row, four images are shown per metal, corresponding to devices D1-D4.

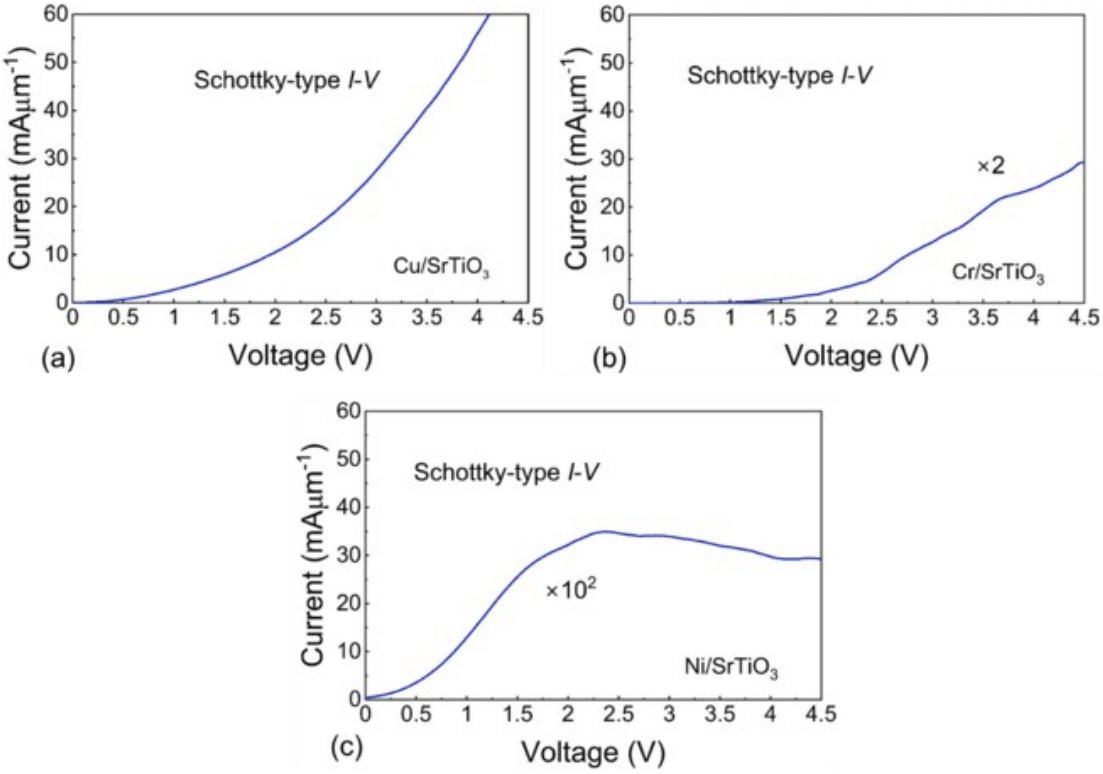

Figure S2. *I-V* characteristics of $SrTiO_3$ device with (a) Cu, (b) Cr, and (c) Ni electrodes

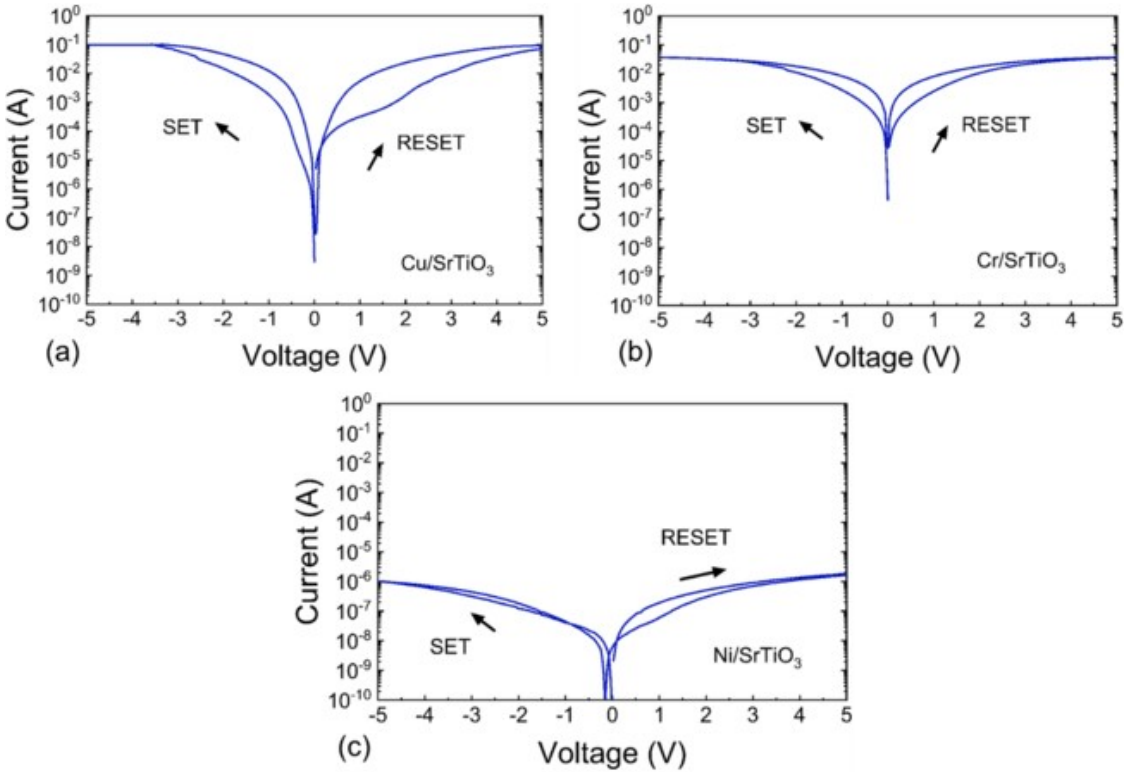

Figure S3. *I-V* characteristics of $SrTiO_3$ device in SET and RESET bias sweeping with (a) Cu, (b) Cr, and (c) Ni electrodes

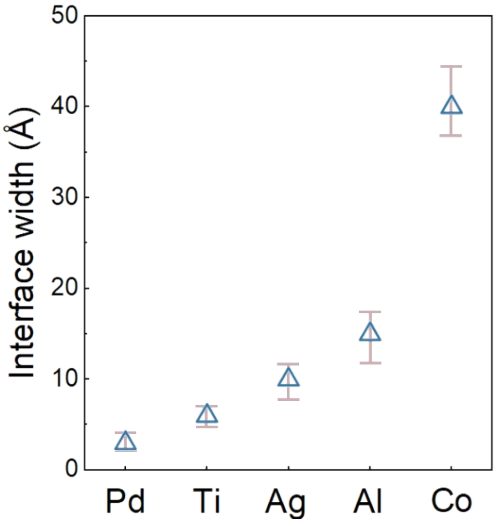

Figure S4. Error bar plot showing the variation in the interface width of different metals

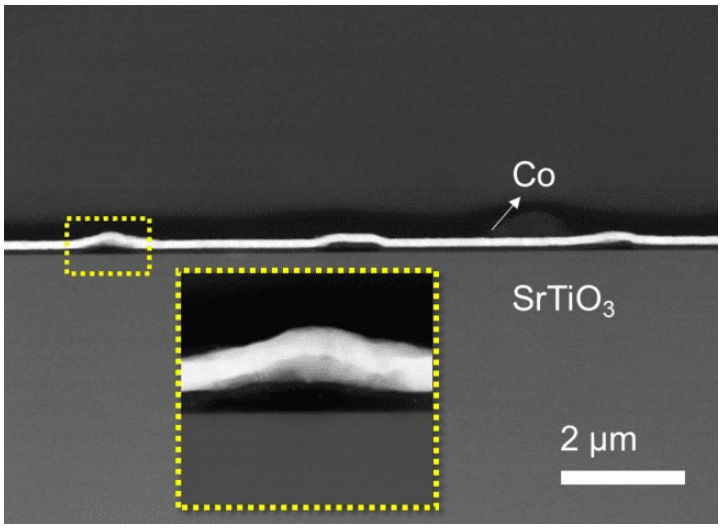

Figure S5. Cross-sectional SEM image of the Co/$SrTiO_3$ resistive switching device. The inset shows a magnified view of an individual device region, highlighting the dome-shaped Co contact and its conformal interface with the $SrTiO_3$ layer.

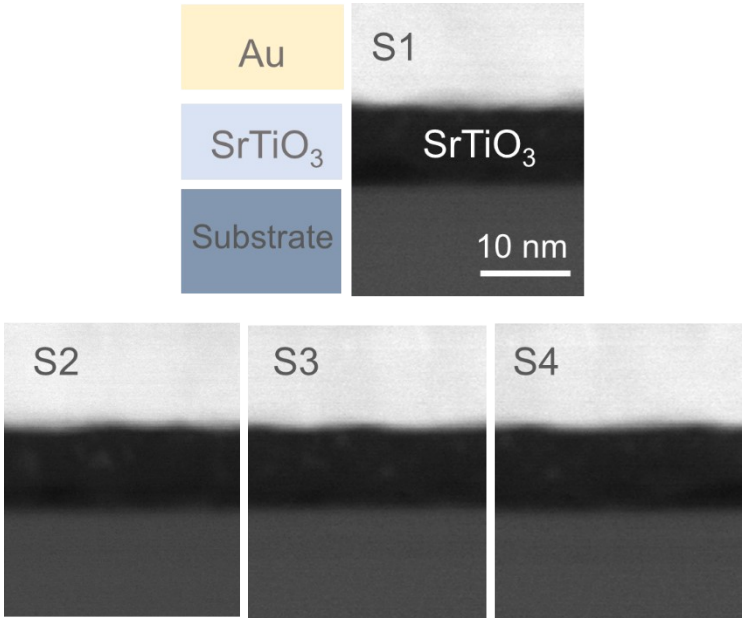

Figure S6. STEM images of four samples(S1-S4) showing smooth film morphology of $SrTiO_3$ film, later used for device fabrication with different metals.

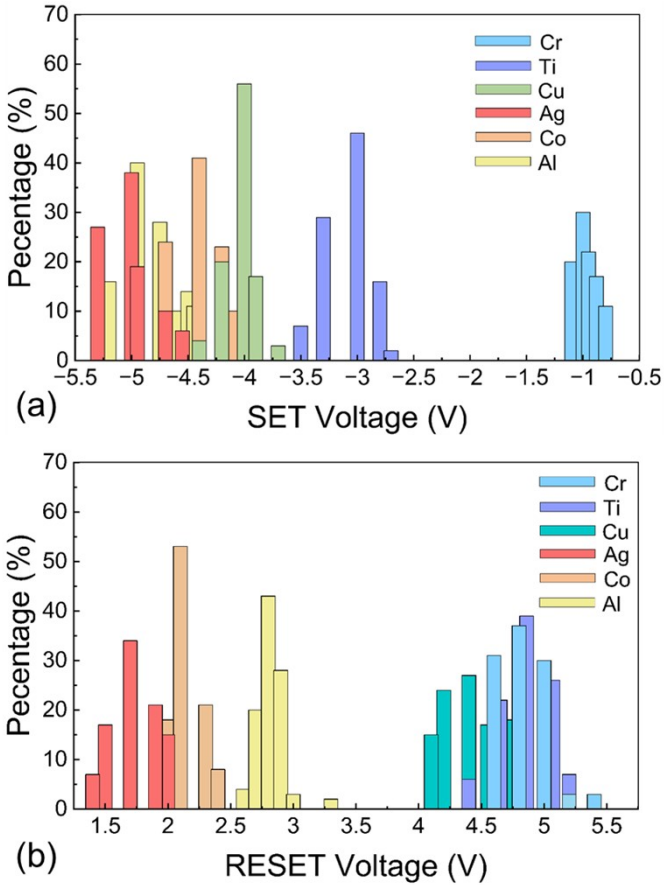

Figure S7. (a) SET and (b) RESET voltage distribution of the $SrTiO_3$ multifunctional devices with different metals.

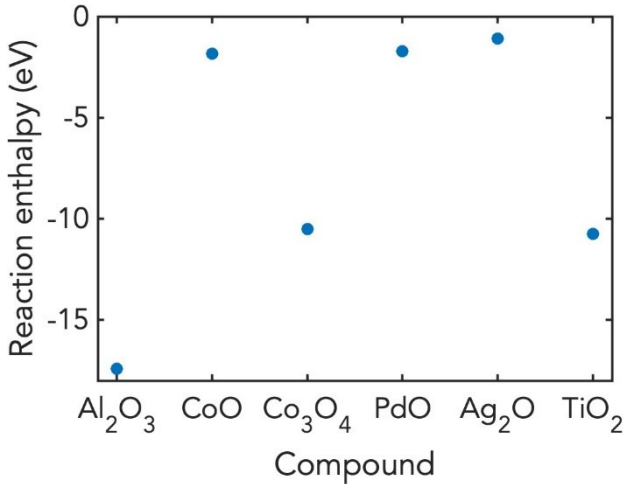

Figure S8. Formation enthalpies of oxides derived from Al, Pd, Ti, Co, and Ag.

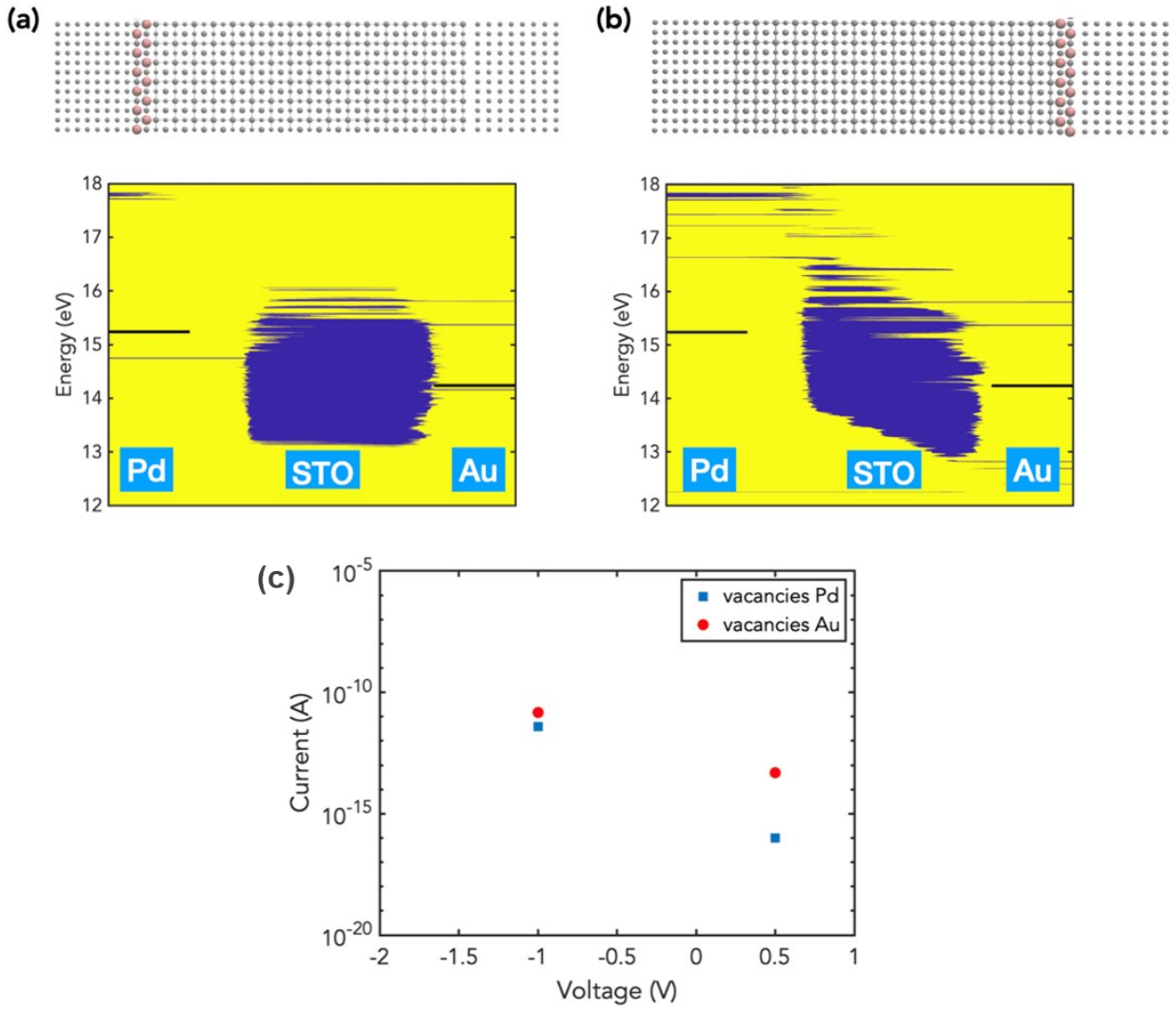

Figure S9. The atomistic structures and the corresponding local density of states (LDOS) plots for Pd-$SrTiO_3$-Au devices with oxygen vacancies (shown in pink) located at the Pd-$SrTiO_3$ (a) and $SrTiO_3$-Au interface (b). Yellow and blue regions denote high and low DOS, respectively. The black horizontal lines indicate the Fermi levels of the electrodes at -1V applied to the Pd electrode (1V applied to the Au electrode). (c) Current for the devices in a-b calculated at -1V and 0.5V voltages.