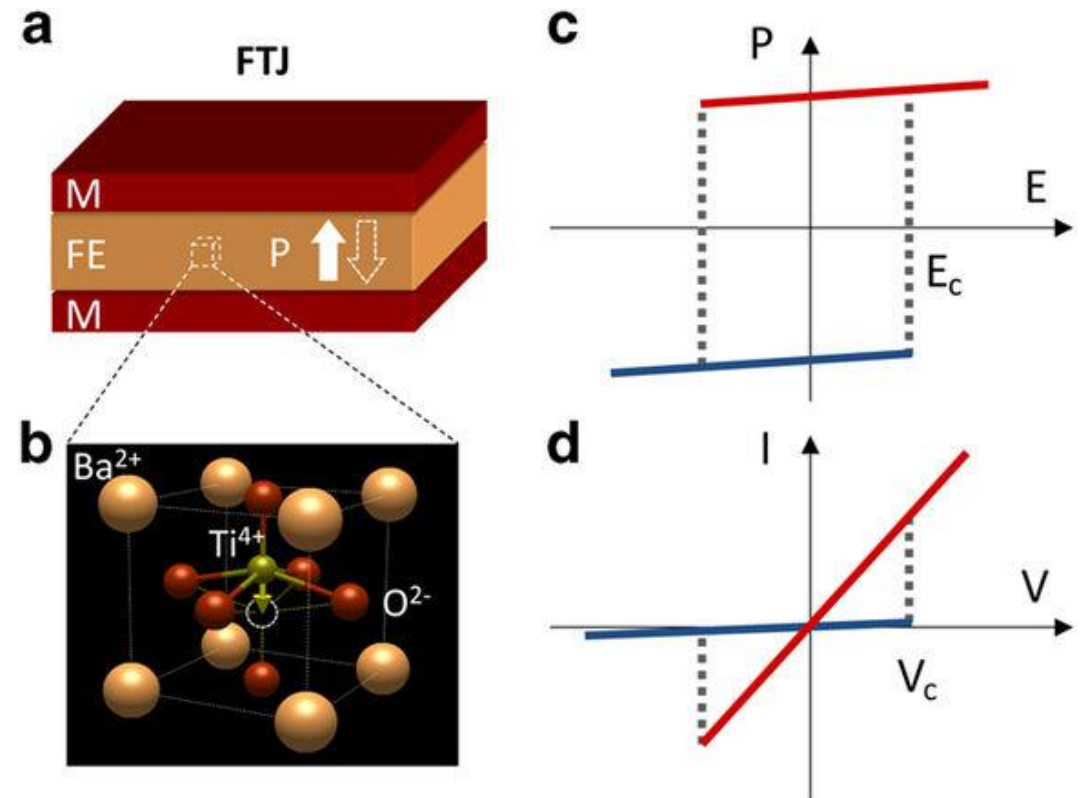


Distinguish FE effect or redox effect in resistance switch

2017-10-06

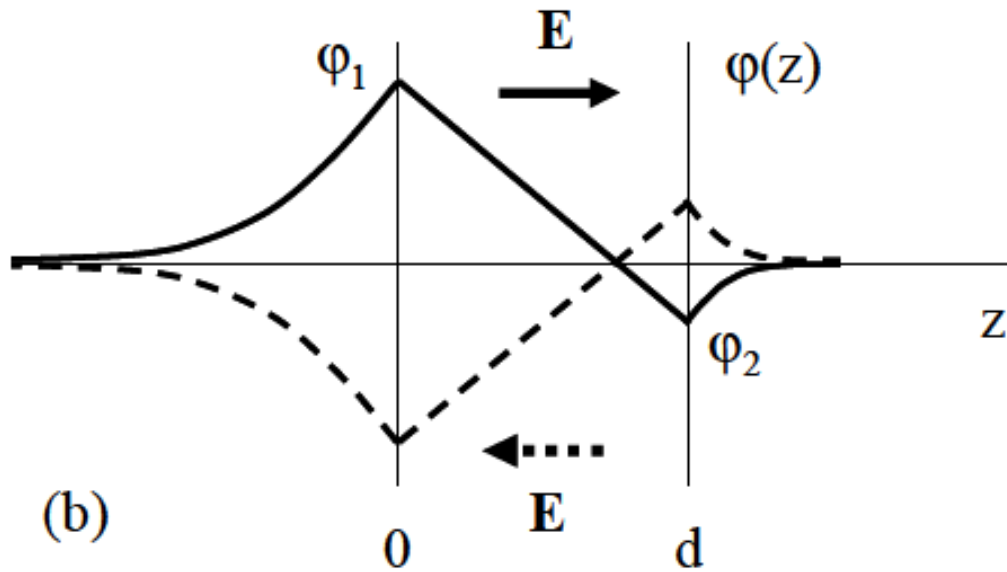
Neo



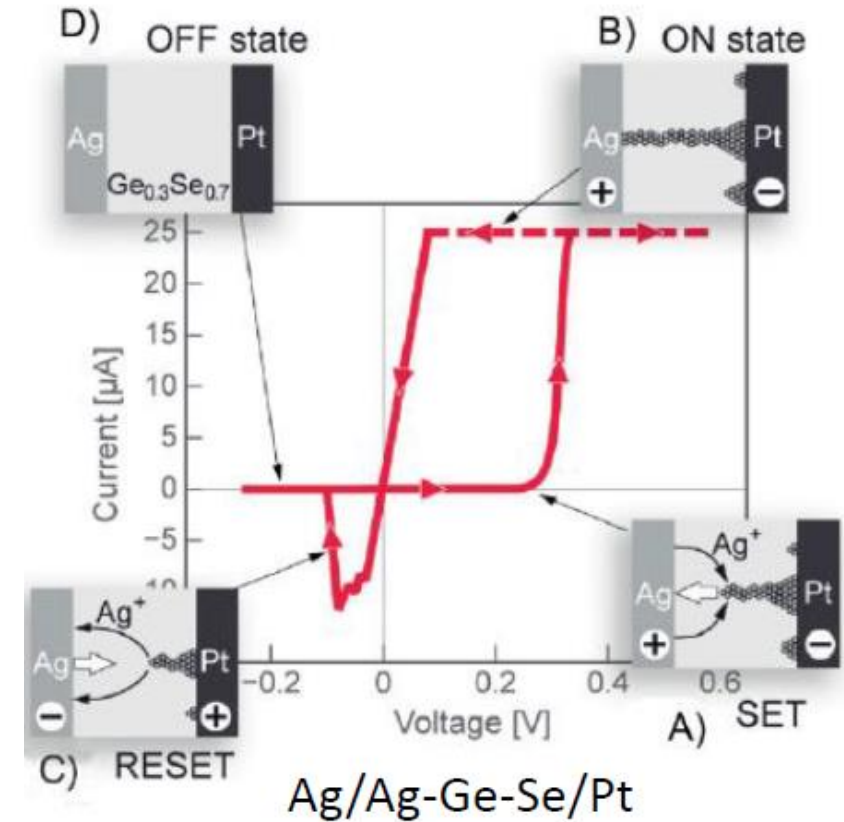
What is resistance switch by FE and Redox?

Due to different electrodes on two sides of FE barrier, there are different potential differences, which change with screening length.

Filament get conducted or not by voltage apply.

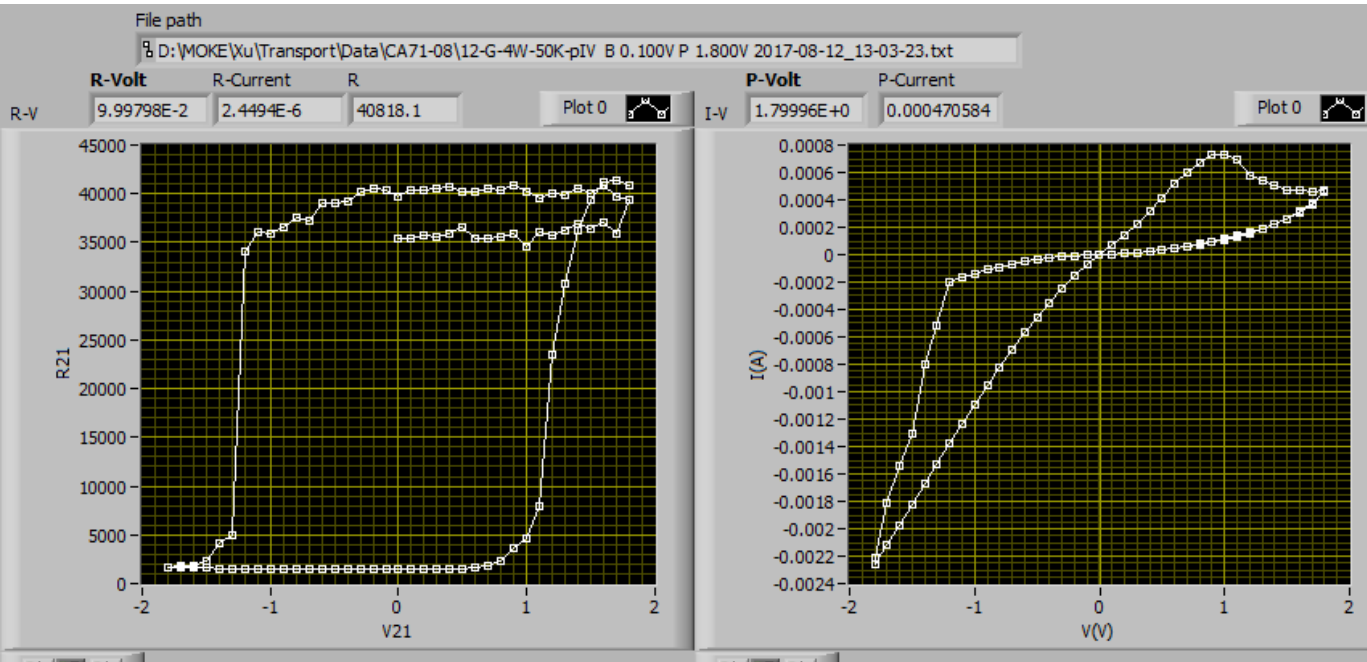


$$I_{\rightarrow/\leftarrow} \propto T \propto e^{-\frac{2}{\hbar} \int \sqrt{2m(V_{\rightarrow/\leftarrow} - E)} dx}$$

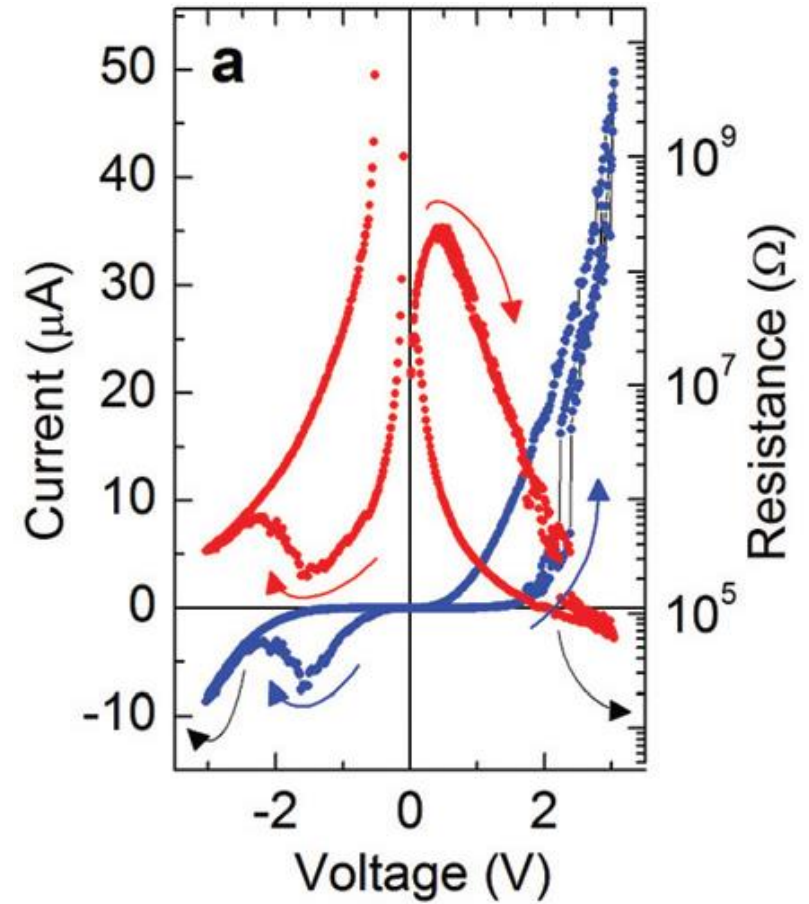


1. I-V measurement

FE resistive switch

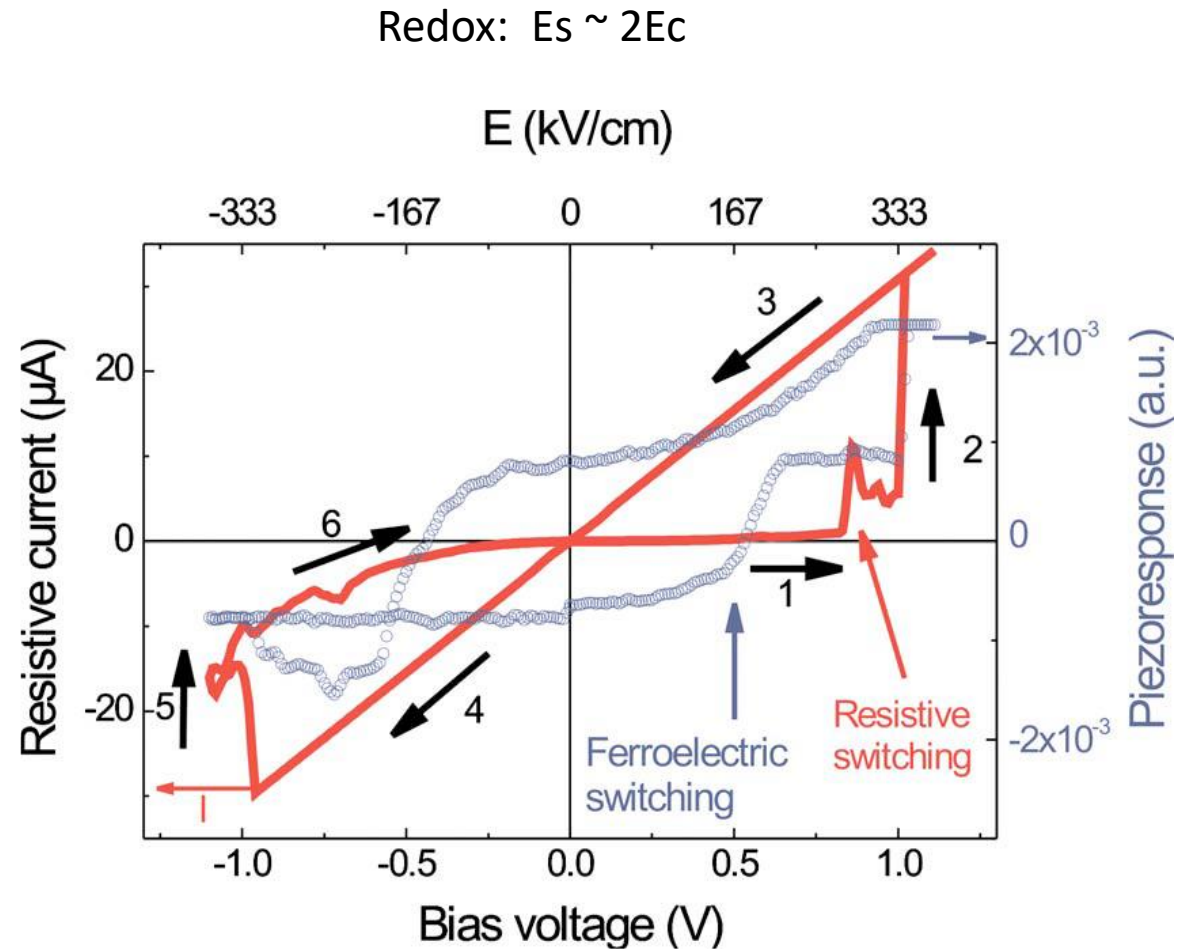
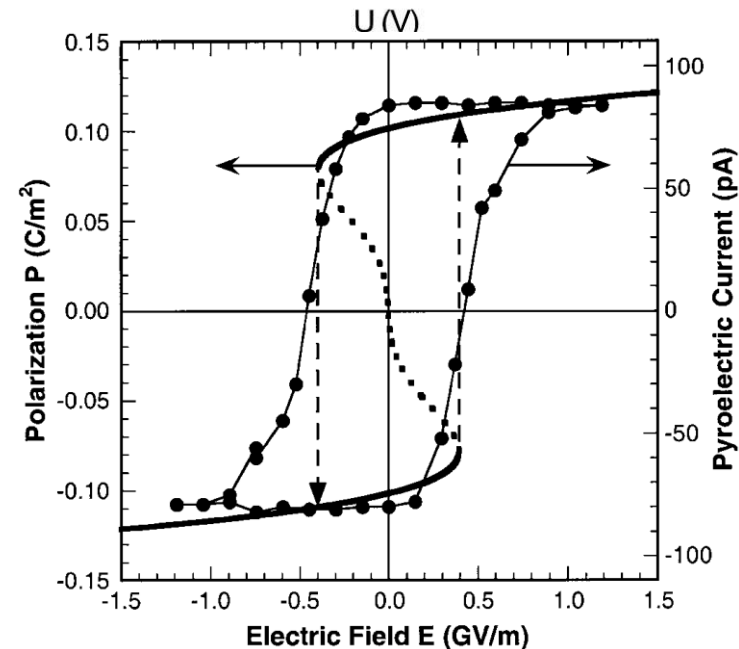
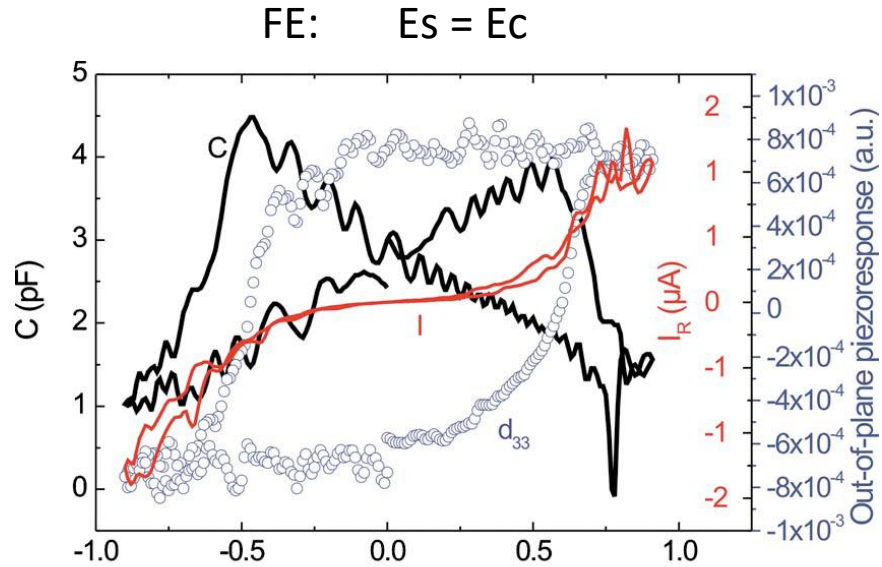


Redox resistive switch



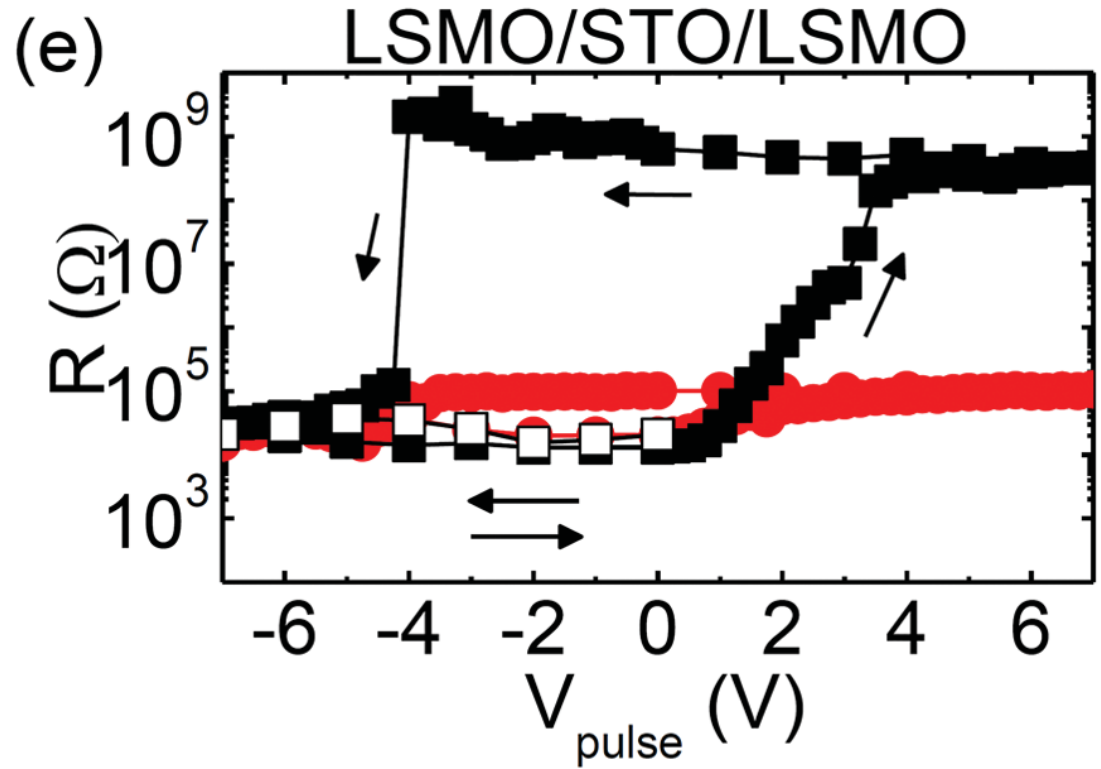
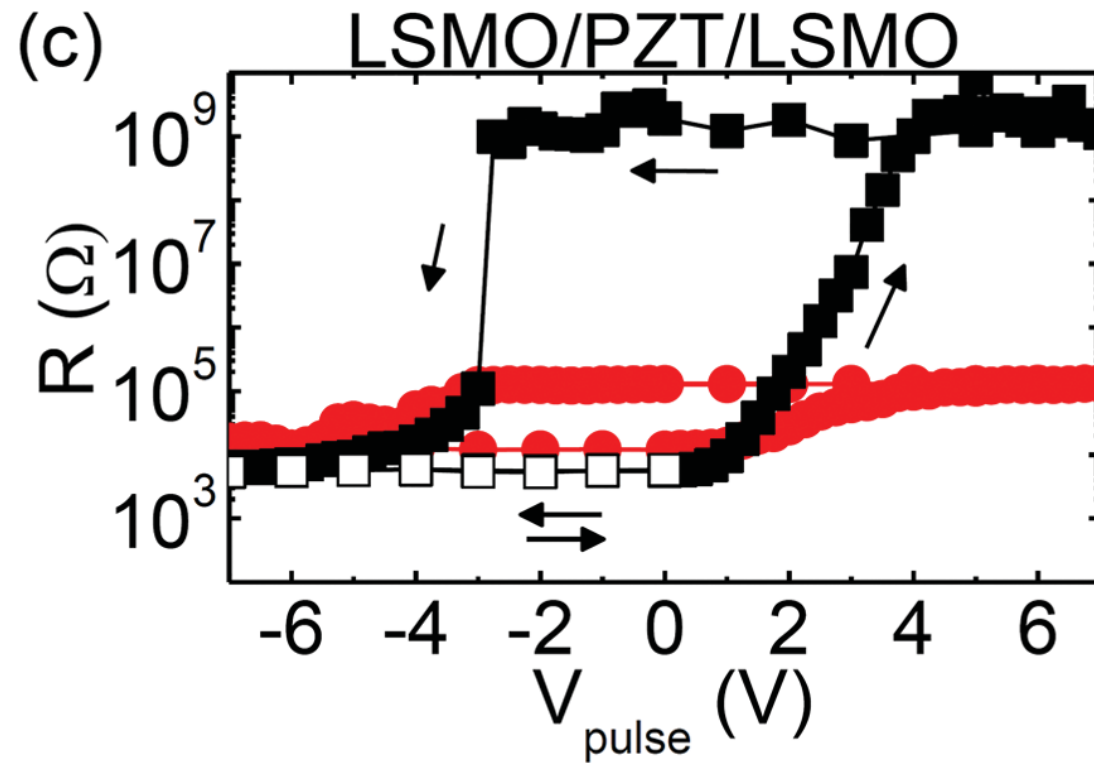
2. Piezoelectric or pyroelectric or CV measurement

E_c vs E_s

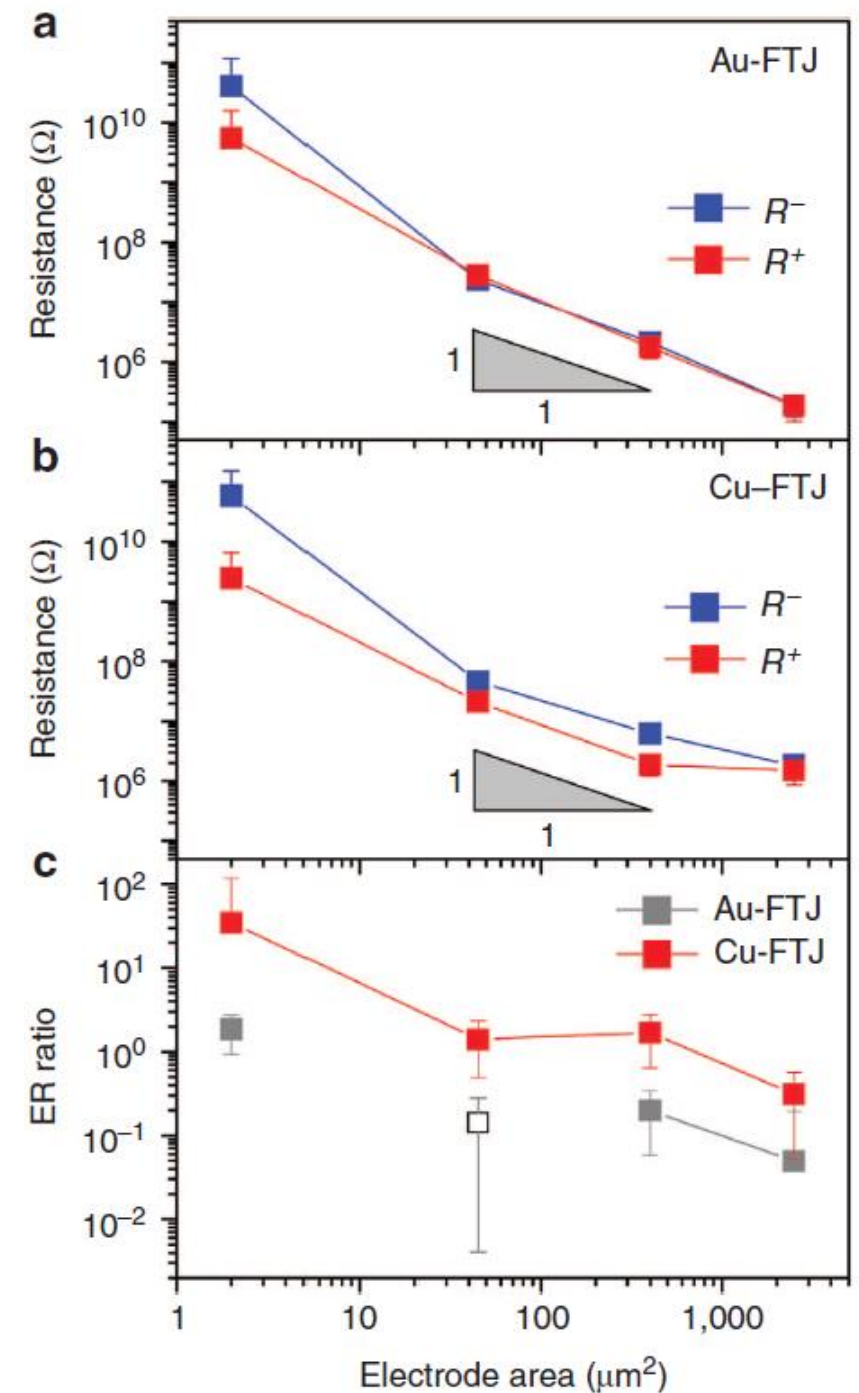
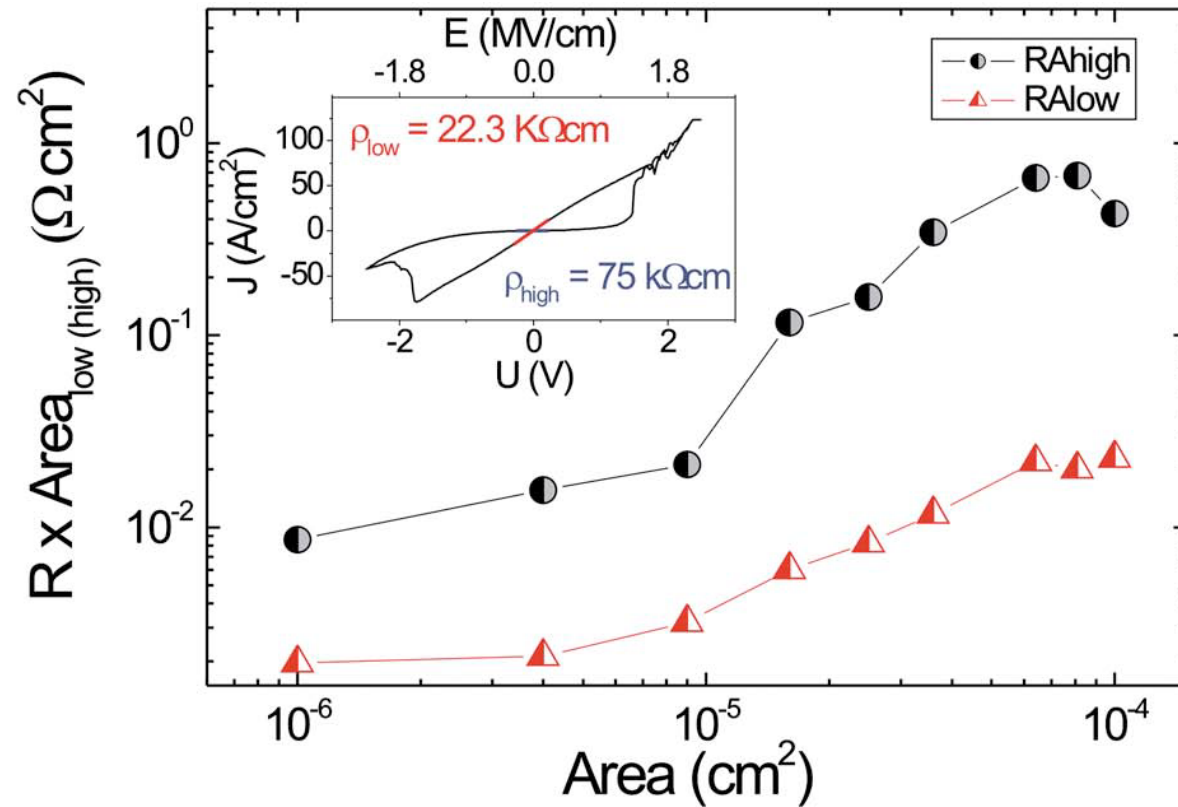


3. Material dependence

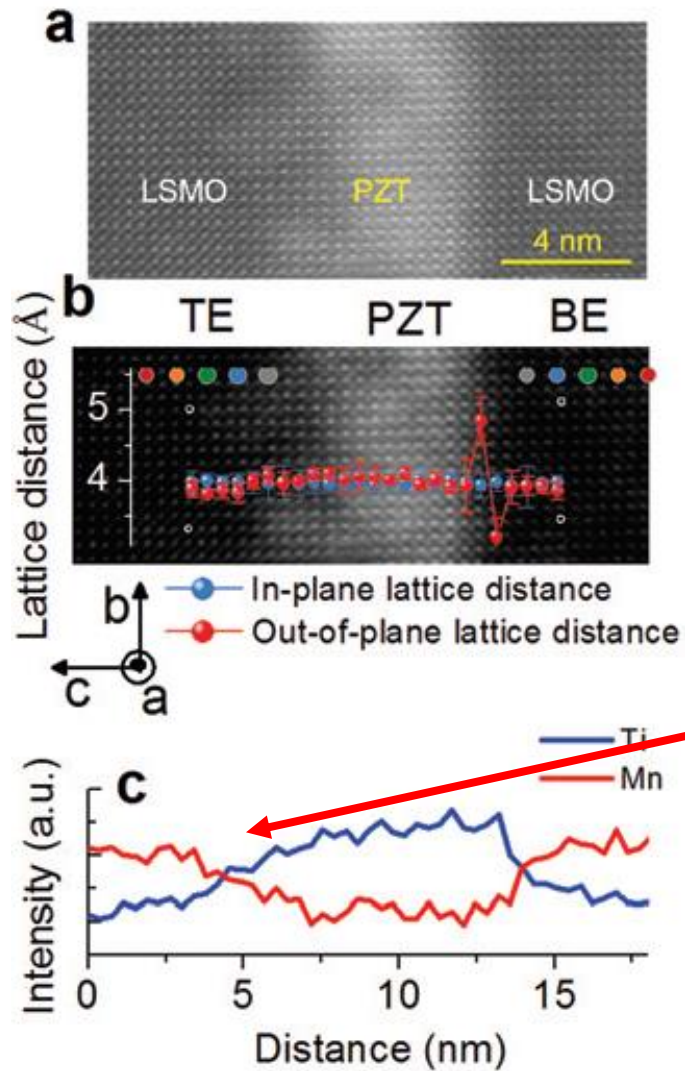
PZT is FE material, while STO is Paraelectric material



4. Area dependence $R \times A$ vs A For FE effect, R indep on Area



5. STEM for diffusion



PZT diffuses into TE

