

Supplementary Information

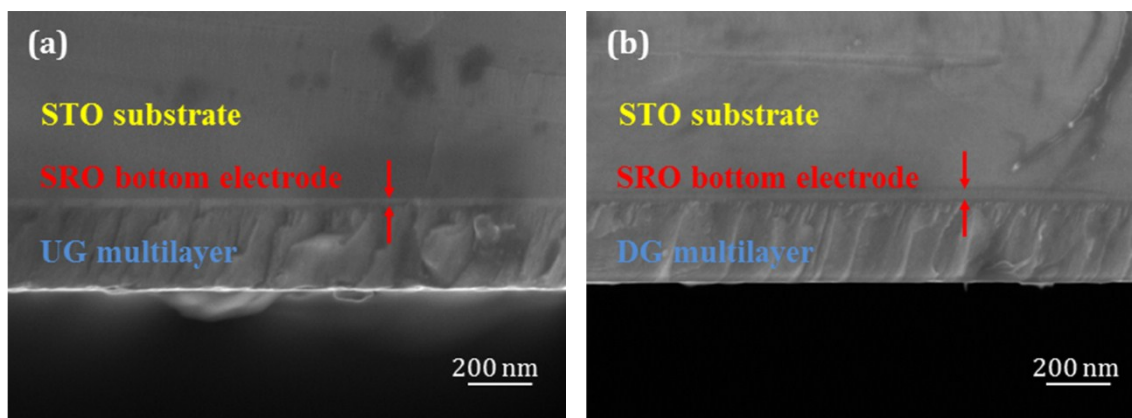


Figure S1 Cross-sectional view of the SEM images for (a) UG and (b) DG multilayers.

Cross-sectional morphologies of UG and DG multilayers are shown in Figure S1. The STO/SRO and SRO/multilayer interfaces are well-defined. However, no obvious layered structure is visible in both multilayers, probably due to the interdiffusion between layers as mentioned in the manuscript. It can be seen that the DG multilayer shows a typical columnar structure throughout the thickness, while the UG structure presents a columnar-like morphology with some granular structure. The difference in cross-sectional morphology can be attributed to the gradient direction-induced differences at interface between multilayer and substrate, top and bottom layers, strain gradient and so forth.