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The effect of oxygen migration for random resistance access memory in oxide-based devices[1] ZHAOLIANG LIAO, Louisiana State University & Institute of Physics, Chinese Academy of Sciences, PENG GAO, YANG MENG, HONGWU ZHAO, XUEDONG BAI, DONGMIN CHEN, Institute of Physics, Chinese Academy of Sciences — The observed electric field induced resistance switching in metal oxide thin films is generally thought to arise from the creation or annihilation of oxygen defects. By depositing different kinds of metal electrodes on $Pr_{0.7}Ca_{0.3}MnO_3$ and CeO_2 thin films to construct sandwiched devices, we found that the devices can be categorized into two groups with different switching behaviors, depending on the Gibbs free energy of oxidation of the top electrodes with respect to that of underneath metal oxide. *In-situ* TEM measurements show a structure change with an applied electric field. Our analysis indicates that the structure change is related to the oxygen migration driven by external electric field. Therefore, it suggests that not only the oxygen defects but also their migration play important roles in the functionality of oxide-based devices

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