Asymmetry-Induced Resistive Switching in Ag-Ag2S-Ag Memristors Enabling a Simplified Atomic-Scale Memory Design

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Prevailing models of resistive switching arising from electrochemical formation of conducting filaments across solid state ionic conductors commonly attribute the observed polarity of the voltage-biased switching to the sequence of the active and inert electrodes confining the resistive switching memory cell. We demonstrate equivalent, stable switching behavior in metallic Ag-Ag2S-Ag nanojunctions at room temperature. Our experimental results and numerical simulations reveal that the polarity of the switchings is solely determined by the geometrical asymmetry of the electrode surfaces. By the lithographical design of a proof of principle device we demonstrate the merits of simplified fabrication of atomic-scale, robust planar Ag2S memory cells [1].

References:

[1] A. Gubicza, D. Zs. Manrique, L. Pósa, C. J. Lambert, G. Mihály, M. Csontos, and A. Halbritter. (2016). Asymmetry-induced resistive switching in Ag-Ag2S-Ag memristors enabling a simplified atomic-scale memory design. [Online]. Available: https://arxiv.org/abs/1604.04168.