Electronic Supporting Information

Electrically- generated Memristor based on Inkjet Printed Silver Nanoparticles

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1. Supporting current-voltage curves for the fabricated devices.

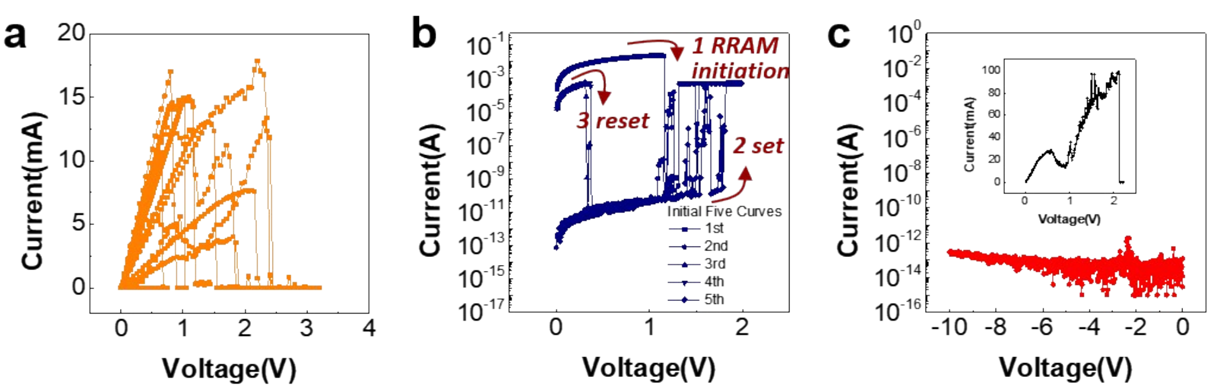

Figure S1 (a) Stochastic Ohmic resistances of planar 1p-ink A devices, representing the incomplete metal sintering from the Ag nanoparticles. (b) Resistive switching in a planar 1p-ink A device after it undergoes the initial metal rupture described in (a). However, the switching is not as reliable as those in the hourglass-shape memristors shown in Figure 1d, and Figures 3-4 in the main text. (c) Memristor switching disabled in an hourglass 2p-ink A device with an abnormally large cross-section. The large cross-section is achieved through assigning a narrow gap between the two metal electrodes during printing. The initial metal rupture was only possible through anomalously high current almost up to 100mA. (Inset figure)

2. COMSOL simulation environment

The adopted parameters for the geometry as well as the resultant absolute temperature and electric field values here may slightly differ from the real situation. The main purpose of this work is to provide insight into the thermofield distribution along filaments with specific geometry, and to compare the differences according to the filament geometry, given identical device and material parameters. 2D device models with hourglass and conical filaments are shown below. The rest of the parameters in the conical filament model are analogous to those of the hourglass shape. The simulation was conducted over the 3D surface rotating the 2D model about the r=0 axis.

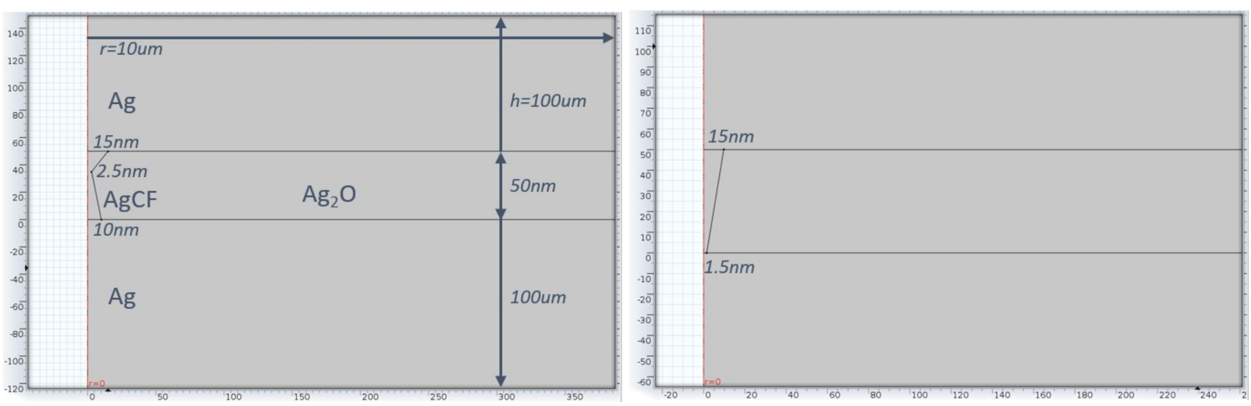

Figure S2 Device model: Geometry

Table S1 Device model: Material

	Thermal conductivity [W/m-K]	Density [kg/m^3]	Heat capacity [J/K-kg]	Electrical conductivity [S/m]
Ag	400	10490	240	2 x 10^6*
Ag_2O	10	7140	284	200

* Experimental value.