Controlled Sulfidation of Silver: A Pathway to Ag_2S for Short-Term Synaptic Emulation

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Supporting Information

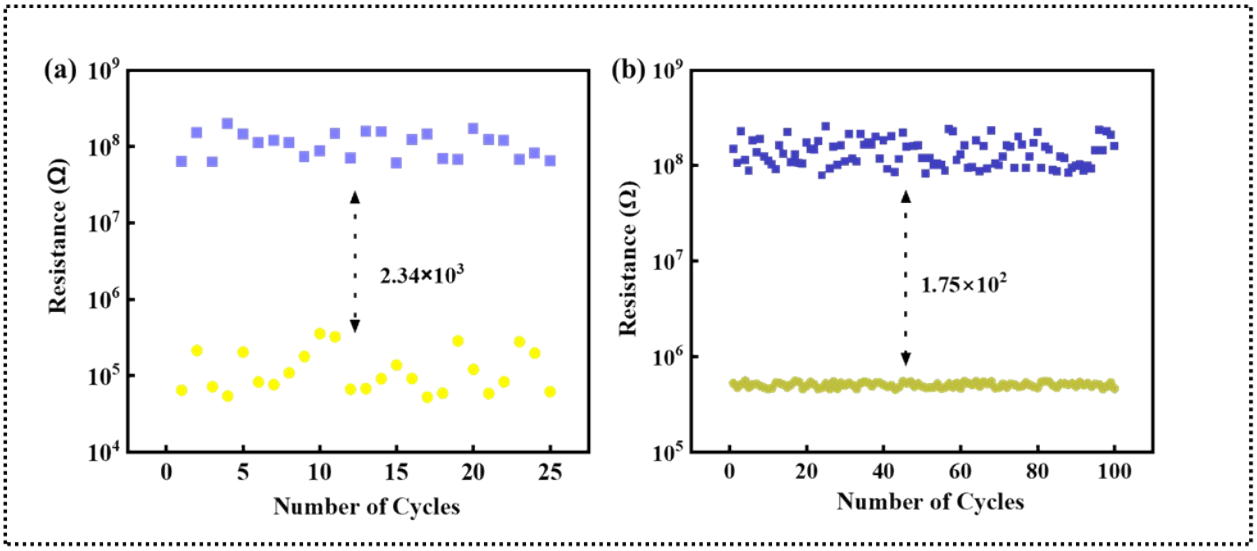


Fig.S1. Endurance graph of (a) 100 µA current compliance (b)10 µA current compliance.

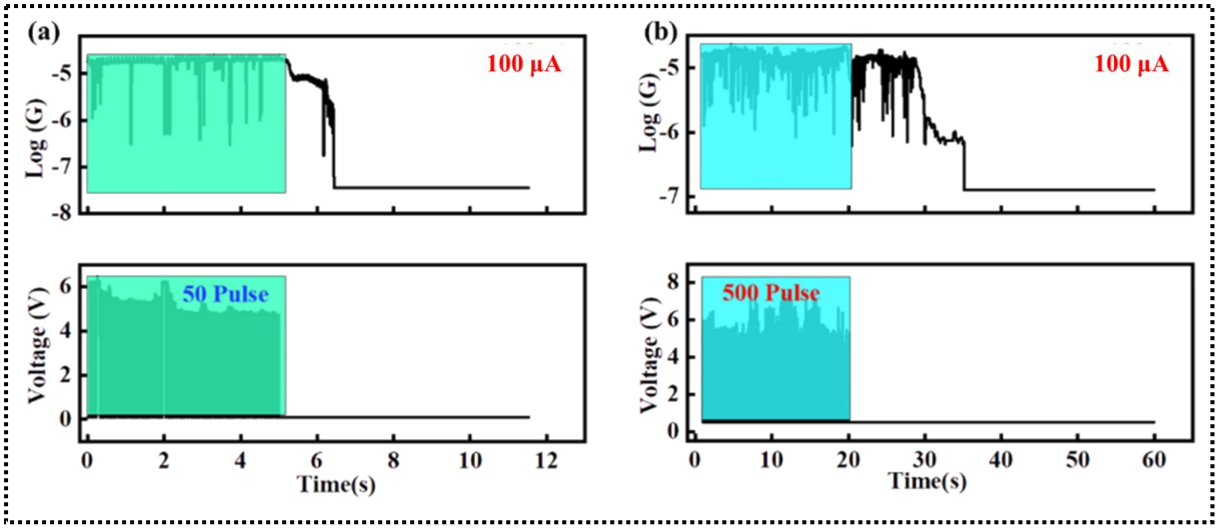


Fig.S2. Conductance potentiation and decay for (a) 50 pulse (green) and (b) 500 pulse 100 µA undercurrent limit following pulsed stimulation.

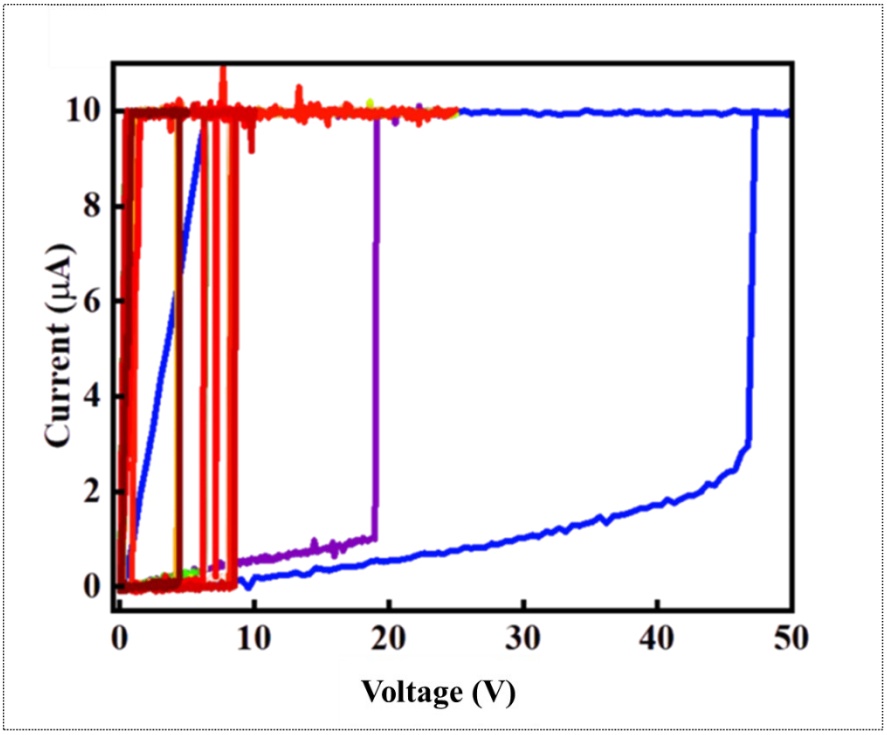
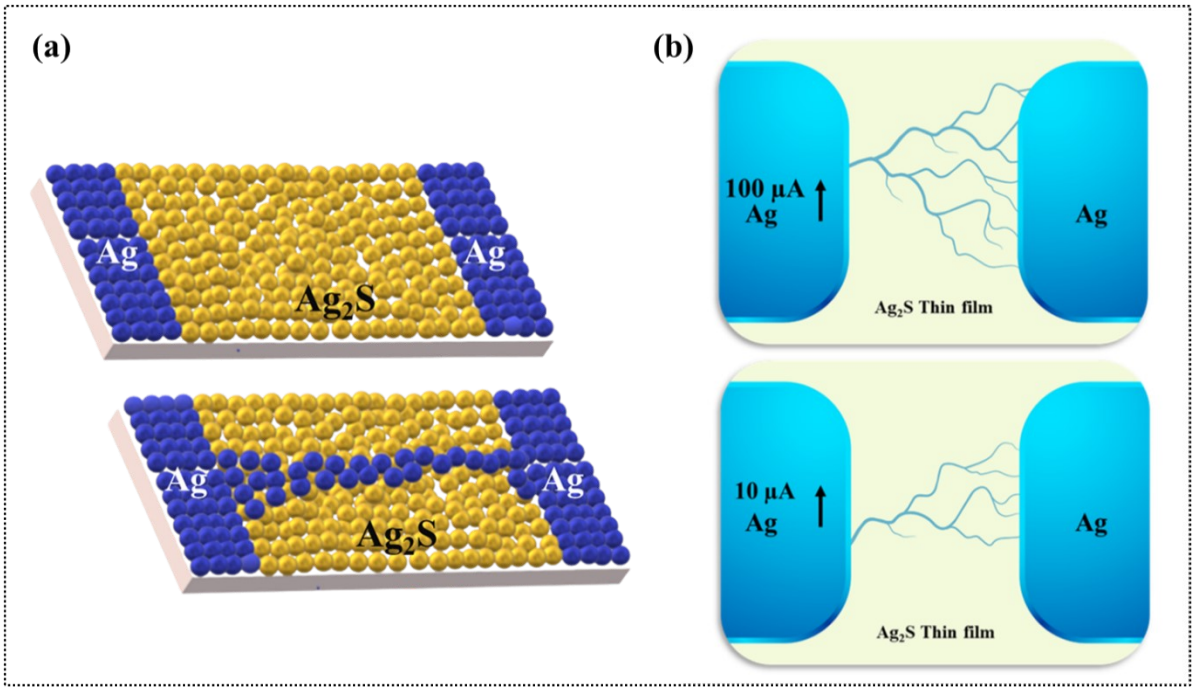


Fig.S3. RS switching of $Ag/Ag_2S/Ag$ device after multiple cycle showing stable switching between 4.5 V to 5.5 V.



Scheme. S1. (a) ECM mechanism of Ag/Ag_2S/Ag device illustrating the influence of current compliance on conducting filament morphology: (b) high-density CFs formed at 100 µA compliance and low-density CFs formed at 10 µA compliance.

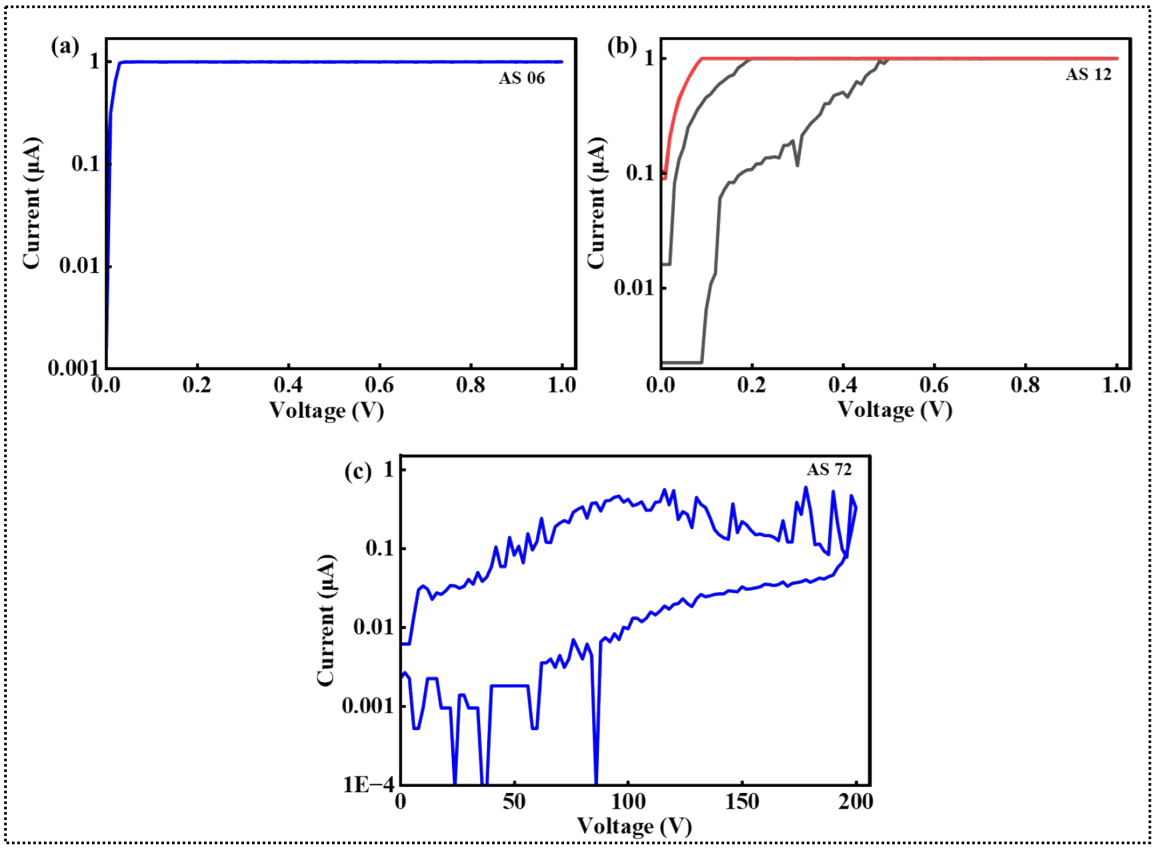


Fig.S4. Current–voltage (I–V) characteristics of Ag/Ag_2S /Ag devices prepared at different reaction times: (a) Ag/AS 06/Ag exhibiting stable ohmic conduction, (b) Ag/AS 12/Ag

showing an initial non-ohmic response followed by conductive behavior from the second cycle, and (c) Ag/AS 72/Ag displaying non-conductive characteristics.

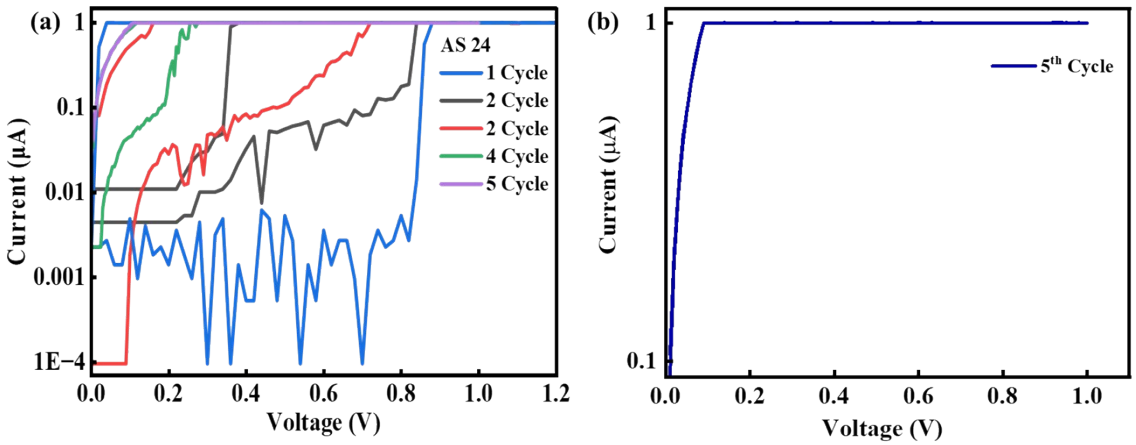


Fig.S5. Current–voltage (I–V) characteristics of the Ag/Ag_2S/Ag device for 24 hours reaction time: (a) I–V response over five consecutive cycles showing resistive switching during the first four cycles, and (b) the 5^{th} cycle exhibiting stable conductive behavior due to permanent filament formation.