Connectivity memory in Ag@TiO_2 nanowire network

Univ. of Tsukuba [1], WPI-MANA, NIMS [2], ◦Qiao Li[1,2], Yoshitaka Shingaya[2], Tomonobu Nakayama[1,2]

E-mail: LI.qiao@nims.go.jp

With the rapid development and emergent wild applications of artificial intelligence software, to achieve artificial intelligence hardware has been optimistic recently. One main topic is to mimic the brain's memorization functions on artificial synapses—materials have memristive properties[1-4]. This work we studied learning and forgetting relationship on Ag@TiO_2 nanowire random network. Unlike common understanding of conventional resistance-based random access memory, here in Ag@TiO_2 network, connectivity in network plays the key role on reactivation of a memory. After activation of a memory, resistance usually rapid increases to a non-conductive state in the rest period. The reactivation time of the memory grows with rest period time (see Figure). This phenomena is more close to the brain's behavior when handling multi-tasks and could help to improve performance on neuromorphic computation.

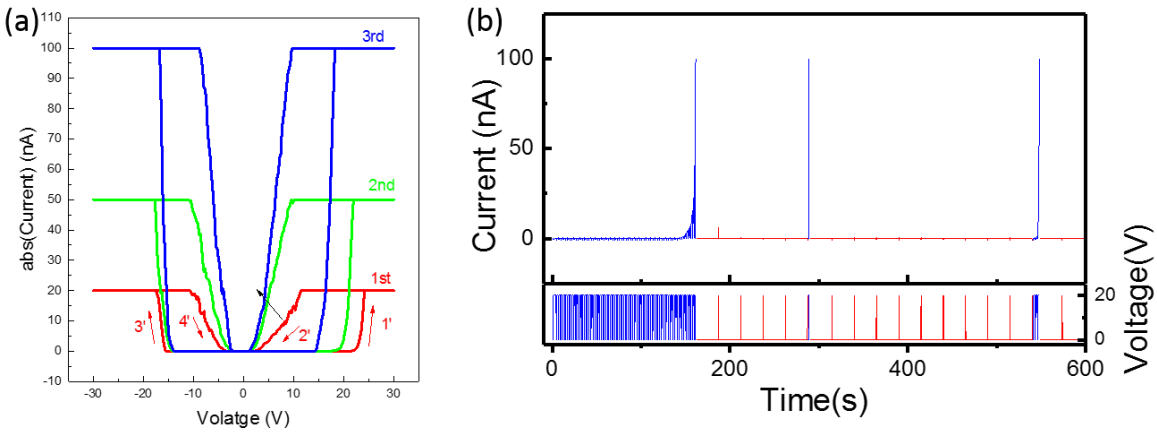

Figure: (a) Typical IV curves for a 40μm*40μm Ag@TiO_2 network. (b)Activation and reactivation of same network in (a). Time needed for reactivation grows as rest duration increases. Blue: activation and reactivation with 0.5Hz pulse (duty; 80%). Red: rest with 0.05Hz pulse (duty: 1%).

References:

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