
Nonvolatile Flexible Bistable Organic Memory (BOM) Device with Au nanoparticles (NPs) embedded in a Conducting poly N-vinylcarbazole (PVK) Colloids Hybrid

Dong Ick Son, Byoung-Wook Kwon, Dong Hee Park, Jeong-Do Yang, and Won Kook Choi

Optoelectronic Materials Center, Korea Institute of Science and Technology

We report on the non-volatile memory characteristics of a bistable organic memory (BOM) device with Au nanoparticles (NPs) embedded in a conducting poly N-vinylcarbazole (PVK) colloids hybrid layer deposited on flexible polyethylene terephthalate (PET) substrates. Transmission electron microscopy (TEM) images show the Au nanoparticles distributed isotropically around the surface of a PVK colloid. The average induced charge on Au nanoparticles, estimated using the C-V hysteresis curve, was large, as much as 5 holes/NP at a sweeping voltage of ± 3 V. The maximum ON/OFF ratio of the current bistability in the BOM devices was as large as 1×10^5 . The cycling endurance tests of the ON/OFF switching exhibited a high endurance of above 1.5×10^5 cycles and a high ON/OFF ratio of $\sim 10^5$ could be achieved consistently even after quite a long retention time of more than 1×10^6 s.

Keywords: Nonvolatile, Flexible, Bistable Organic Memory, Au nanoparticles, polymer, Hybrid