Resistive Switching Memory Devices Based on Iron Phthalocyanine Multilayers via Layer-by-Layer Assembly

구본기, 조진한*
고려대학교 화공생명공학과
(jinhan71@korea.ac.kr*)

We introduce a facile and robust approach for the preparation of iron phthalocyanine (FePC) multilayers, which allow the highly enhanced electronic properties as well as the dense and homogeneous adsorption of molecules. Nonvolatile resistive switching memory devices (NRSM) have recently attracted much interest due to the simple device structure, fast switching speed, high ON/OFF ratio and low operating voltage. Herein, we establish the NRSM properties of FePC multilayers based on the electrostatic layer-by-layer assembly method. Cationic poly(allyamine hydrochloride) and anionic FePC were deposited alternately onto Pt-coated silicon substrates using electrostatic interactions at mild condition. When external bias was applied to the devices, bipolar switching properties were observed at low operating voltages showing the high ON/OFF ratio, long term stability and rapid switching speed. These phenomena were mainly caused by a charge trap and release mechanism at the redox sites within the iron phthalocyanine.