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Ionic-doping-induced nonvolatile switching in conductive polymer/inorganic complex for nonvolatile memory QIANXI LAI, YONG CHEN, Department of Mechanical & Aerospace Engineering, University of California-Los Angeles — Organic nonvolatile memories have received extensive attention in recent years due to their low cost and highly scalability. We have studied the nonvolatile switching property of a metal/conductive polymer (MEHPPV)/metal system which is induced by ionic doping under electric field. The switching phenomenon have been observed both in devices doped by electrochemical doping in liquid solution (TBAI) and in devices integrated with a solid electrolyte (RbAg4I5) in the device structure. The device can be switched from its high-resistance state (OFF) into its low resistance state (ON) by a threshold voltage with appropriate polarity and vice versa. The switching on/off ratio is more than 3 orders of magnitude with a switching time as short as 1us and the switching is reversible and repeatable. The resistance change is attributed to the reversible p-type doping of MEH-PPV by injecting/extracting iodide anions into/from the conductive polymer under the voltage bias above certain threshold amplitude. The results of Capacitance-Voltage (CV) measurements also indicated the ion migration in the polymer under the electric field.

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