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WORM Behavior of 6F-TPA PI by Hole Injection

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Polymer memory devices have attracted considerable attention because of their advantages such as low cost potential, good scalability, flexibility, simplicity in structure, and large capacity for data storage. Metal/poly (4,4'-aminotriphenylene hexafluoroisopropylidenedipthalimide) (6F-TPA PI)/metal system has been found to show an electrical bi-stable behavior. Here, we show a novel set-up of 6F-TPA PI/Al sample in which holes are injected by photoelectron emission process instead of direct charge carrier injection via metal electrode. In this process, an irreversible electrical phase transition of 6F-TPA PI is found, leading to a write-once-read-many (WORM) behavior. The photoelectron spectroscopy results measured before and after the switching process revealed that the irreversible electrical phase transition of 6F-TPA PI is attributed to the chemical modification of the carbonyl group in phthalimide moiety.

Keywords: Polymer, Memory, X-ray spectroscopy

