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PENTACENE-BASED NONVOLATILE ORGANIC BISTABLE MEMORY DEVICES

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p-Conjugated organic semiconductors-based bistable memory devices have been intensively studied for new organic electronics [1]. Nonvolatile organic bistable memory devices (OBDs) were fabricated by using the vapor deposition of p-conjugated pentacene molecules. The pentacene layer containing co-sputtered layer of Al and Al₂O₃ as a middle layer was used as active layer, as shown in Fig. 1. In these OBDs, memory effects were observed in terms of the hysteresis characteristics of current-voltage (*I-V*). The pentacene-based OBDs had two different conductance states, i.e., high and low conductances which were electrically driven by applying positive and negative bias. The pentacene layers could be served as charge injection and transport layer. The Al/Al₂O₃ middle layer was served as charge storage by charge trapping. The current on and off states of the OBDs were characterized through temperature dependence of the *I-V*. Capacitance-voltage characteristics of the pentacene-based OBDs were also measured and analyzed at various frequencies.

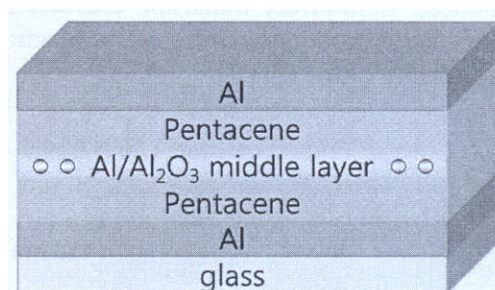


Figure 1. Schematic structure of pentacene-based bistable memory device

Reference

1. Y. Yang, J. Ouyang, L. Ma, R. J. Tseng, and C. Chu, *Adv. Funct. Mater.* **16**, 1001 (2004).