Organic memory-
a new direction of organic electronic devices

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The ability to process large area substrates coupled with the low cost of fabrication, using organic molecules, have made them important electronic and photonic materials for applications such as light-emitting diodes, field-effect transistors, lasers, and photovoltaic cells.

Recently, we observed that organic devices exhibit strong electrical bistable states, each with a remarkably different electrical conductivity. The transition from a low conductive state to a high conductive state is accompanied by an enhancement in injection current by six orders of magnitude. (Top figure left.) Furthermore, The transition time from the low to high conductance state is as short as nanoseconds. (Middle figure left.) The low conductive state can be re-established by applying a reverse voltage pulse. The state of the devices can follow the write-read-erasure-read voltage pulse quite well. (Bottom figure left.) Both the low and high conductive states show good stability.

The high performance of our memory devices provides the possibility of fabricating low cost, high-density memory matrixes. We anticipate this device creates a new direction for the field of organic electronic devices.