

High performance ambipolar organic transistors

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Recent significant development of organic electronics is worthy of notice for its practical application as well as fundamental understandings. Complementary-like logic circuit is a key factor to realize actual operating organic electronic devices since its advantages of low power dissipation, good noise margin and stable operations. In this reason, studies on ambipolar properties of organic materials which can act as either n-type or p-type are getting more attentions. Performances of ambipolar transistors vary a lot along its molecular structures and film properties. When properly fabricated, balanced hole and electron mobilities over 1 cm²/Vs were observed recently. Study of charge transport in ambipolar organic transistors to understand this high performance was carried out through charge modulation spectroscopy.

Keywords: Organic transistors, Ambipolar transistors, Charge transport

Templated solid-state dewetting of thin films

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Solid-state dewetting of thin films is a process through which continuous solid films decay to form islands. Dewetting of thin films has long been a critical issue in microelectronics and much effort has been made to prevent the process and enhance the stability of films. On the other hand, dewetting has also been purposely induced to create arrays of particles and other structures for applications, including plasmonic structures and catalysts for growing nanotube and nanowire. We have investigated ways of producing regular structures via templated dewetting of thin films. Mainly, two different approaches have been used in our works to template dewetting of thin films: periodic topographical templating and planar patterning of epitaxially-grown films. Dewetting of topographically-patterned thin films results in the formation of nanoparticle arrays with spatial and crystallographic orders. Morphological evolution during templated-dewetting of single crystal films occurs in deterministic ways because of geometric and crystallographic constraints, and leads to the formation of regular structures with smaller sizes and more complex shapes than the initial patches. These results will be reviewed in this presentation.

Keywords: Dewetting, Thin film, Templated self-assembly