

High-performance, Flexible Graphene Field Effect Transistors on Plastic substrates

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A high performance low-voltage graphene field-effect transistor (FET) array was fabricated on a flexible polymer substrate using solution-processable, high-capacitance ion gel gate dielectrics. The high capacitance of the ion gel, which originated from the formation of an electric double layer under the application of a gate voltage, yielded a high on-current and low voltage operation below 3 V. The graphene FETs fabricated on the plastic substrates showed a hole and electron mobility of 203 ± 57 and 91 ± 50 $\text{cm}^2/\text{V}\cdot\text{s}$, respectively, at a drain bias of -1 V. Moreover, ion gel-gated graphene FETs on the plastic substrates exhibited remarkably good mechanical flexibility. This method represents a significant step in the application of graphene to flexible and stretchable electronics.

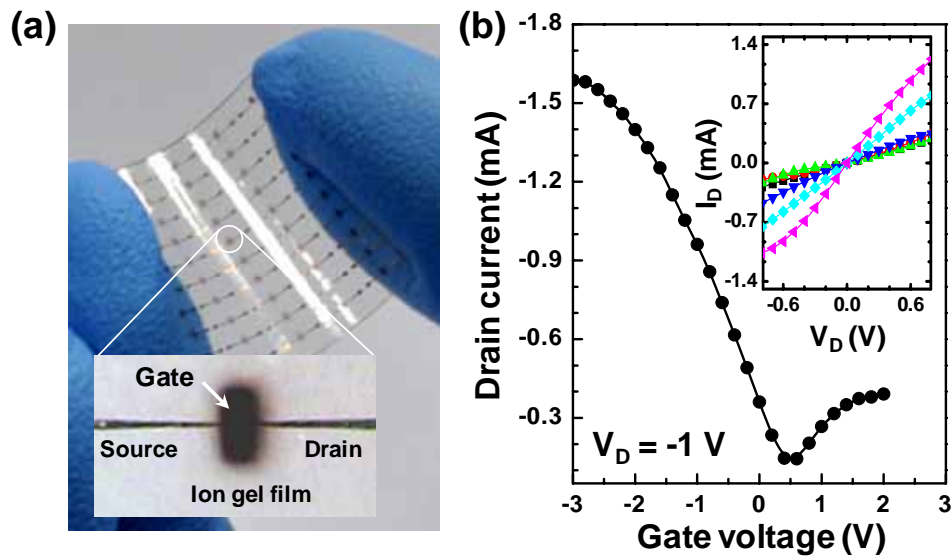


Figure. (a) Optical images of an array of devices on a plastic substrate. (b) Transfer and output characteristics of graphene FETs on plastic substrate.