

### The OTFTs including Soluble-based TiO<sub>2</sub>-PVP composite gate insulator for low operating voltage

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We introduce the TiO<sub>2</sub>-PVP composite dielectric materials for OTFTs in order to operate at low voltage. The gate insulator with TiO<sub>2</sub>-PVP composite materials were fabricated by solution process, such as spin coating. Because of TiO<sub>2</sub> precursor, it composites well in cross-linked PVP, the composite materials are appropriate for solution process and have enhanced the dielectric constant of gate insulator. We manufactured the OTFTs with pentacene as semiconducting layer, which was improved field-induced current than that of conventional transistors including polymer (PVP) dielectric layer due to TiO<sub>2</sub>-PVP composite gate insulator with rather increased dielectric constant. The OTFTs, including TiO<sub>2</sub> materials in gate insulator, show the performance of transistor with low threshold voltage and enhanced on/off ratio in low operating forward bias.