

Electrical characterization of thin-film transistor organized of silica – based hybrid dielectric

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So far, organic or inorganic TFT (Thin Film Transistor) has been studied extensively, because the TFT has been a very crucial part of display industries. In this study, an organic-inorganic hybrid compound was adopted as a gate insulator. For active or semiconductor layer, pentacene was evaporated and for electrode, gold was deposited to make TFT device structure. The hybrid dielectric is organized of MPTMS (Methacryl oxypropyl trimethoxy silane) and TEOS (Tetra ethoxy silane) compound with carbon-based polymer. Glass substrate with Al gate pattern and heavily doped Si substrate for common gate were used as a gate structure. TEOS and MPTMS was mixed and optimized in several weight ratio and PVA (Poly Vinyl Alcohol) was added as a organic material. The hybrid films were prepared by spin-coating, treated by UV, and annealed. After annealing, pentacene and gold electrodes were deposited sequentially. We analyzed electric properties and structural properties of the device by using semiconductor parameter analyzer, C-V measurement, FT-IR and FE-SEM.