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Organic Thin Film Transistors with Gate Dielectrics via Sol-Gel Process JUNE WHAN CHOI, Department of Material Science & Engineering, Korea University, SUNGWON CHOI, JAE-WOONG YU, Optoelectronic Materials Research Center, Korea Institute of Science and Technology, HO GYU YOON, Department of Material Science & Engineering, Korea University, JAI-KYEONG KIM, Optoelectronic Materials Research Center, Korea Institute of Science and Technology — The presents work focuses on the preparation of gate dielectrics by the sol-gel process and the characterization of resultant organic thin film transistor (OTFTs). The basic requirements for the gate dielectric materials of OTFTs are high dielectric constant, low leakage current and the patternability. To obtain suitable gate dielectrics, the feasibility of sol-gel process and UV crosslinking were investigated. Acryl UV resin (DCS-SP210, Dongjin Semichem Co.,Ltd.), titanium n-butoxide, HCl and acetyl acetone were used to prepare a hybrid reaction medium. We obtained the result that the leakage current of dielectric layer was maintained under 10^{-9} A in the OTFTs operating voltage, the dielectric constant was about 9 at 10 KHz and the rms was about 2-3 nm. OTFTs were fabricated with pentacene (45 nm) and the resultant dielectric layer. The field effect mobility and on-off ratio were $1.1 \text{ cm}^2/\text{V}\cdot\text{s}$ and 10^4 , respectively. The result proved that sol-gel hybrid system was suitable for the gate dielectrics of OTFTs in the requirements of the electric, dielectric property and the patternability.

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