A Polymer Gate Dielectric for High-Mobility Polymer Thin-Film Transistors and Solvent Effects

박준형, 박세영, 이홍희*
서울대학교
(honghlee@snu.ac.kr*)

A polymer gate dielectric of poly(2-hydroxyethyl methacrylate) is introduced to the polymer thin-film transistor (TFT) with poly(3-hexylthiophene) as its active layer. With this polymer dielectric, the field-effect mobility is 0.1 $cm^2V^{-1}s^{-1}$, a five times increase over the highest mobility reported for the TFT with a polymer dielectric and a polymer semiconductor. The solvent used in forming the active layer on the polymer dielectric film has pronounced effects on the device performance. These solvent effects are related to the roughness of the dielectric surface a solvent can induce. The solvent that induces the least roughness is found to be the most desirable for better device performance. The roughness can in turn be related to solubility parameter.