Exploiting Counterpart Charge Transport in Bulk Heterojunction Sensing Channel Layers for Organic Phototransistors

이철연, 김준우, 김화정, 김영규†
경북대학교
(ykimm@knu.ac.kr†)

Organic materials, which have good solubility in solvents, have been highlighted because they can undergo wet processes such as spin-coating, gravure printing, etc. This concept can be extended to 3D printing once orthogonal solution strategy is provided in the near future. To date, a variety of soluble small molecules have been used for wet-processed organic electronic devices including organic light-emitting devices (OLEDs), organic solar cells (OSCs), organic field-effect transistors (OFETs), etc. Of various organic small molecules with semiconducting properties, diketopyrrolopyrrole (DPP) derivatives, which contain alkyl chains for improved solubility, have attracted keen interest because of the durable DPP cores with two carbonyl groups. However, the film-forming property of such DPP derivatives was not always in good agreement with the solubility. In this work, we demonstrate that new DPP derivative, which is synthesized to have a symmetric molecular geometry but inevitably poor film-forming property, can be effectively used as a sensing molecule by the aid of counterpart charge transport in the bulk heterojunction channel structures in organic phototransistors.