

Organic Phototransistors with Lewis Acid-doped Polytriarylamine Gate-Sensing Layers for Efficient Detection of Short-Wave Infrared Light

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Organic photodetectors, which consist of organic thin films, have attracted interest as a next-generation sensor. Organic photodetectors benefit points of organic semiconducting materials which include actual fine-tuning of light-absorbing wavelengths through molecular design. Organic photodetectors are broadly classified into two types, organic photodiodes and organic phototransistors. Organic phototransistors should take better positions over organic photodiodes. To date, organic phototransistors for the detection of visible light have been extensively studied but very limited works are available on organic phototransistors that can sense infrared light. In this regard, our group has demonstrated series of near infrared (NIR) light-sensing organic phototransistors with NIR-absorbing conjugated polymers. In this presentation, we show that organic phototransistors with polyarylamines doped with Lewis acids can efficiently detect a SWIR light. The design of materials and device structures will be discussed in the presence of sensing data including transistor characteristics.