

Flexible Hybrid Photodetectors Based on the Graphene and Organic Semiconductor
Functionalized with a Ru-complex

이은광^{1,2}, Xien Liu¹, 김동영¹, 박철휘², 오준학^{2,†}
¹유니스트; ²포항공과대학교
(joonhoh@postech.ac.kr[†])

The Internet of Things (IoT) is the network of physical objects or "things" embedded with electronics, software, sensors, and connectivity to enable objects to exchange data with the manufacturer, operator and/or other connected device. In order to materialize the IoT, smart and wearable sensors should be commercialized. For that reason, the carbon based materials such as organic semiconductors (OSCs) and graphene and carbon nanotube have attracted great attention for the smart and wearable sensors due to their low cost and light weight and mechanical flexibility. However, graphene and OSC typically have low light absorption, not enough for use in high-performance photodetectors. A Ru-complex was synthesized and applied to the graphene and BPE-PTCDI(n-type organic semiconductor) FETs via a simple solution method. The performance of these photodetectors was greatly improved due to the metal-ligand charge transfer (MLCT). In addition, the fabricated devices were operated on a transparent plastic substrate under various bending radii. Our study paves a simple way to improve photoresponsivity of carbon-based material such as graphene and OSC for smart and wearable devices.