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EVENT: IDEALS CREST BIO-INSPIRED GREEN

PLASMON COUPLING IN *N*-SUBSTITUTED DIKETOPYRROLOPYRROLE-THIOL MONOLAYERS SELF-ASSEMBLED ON Ag SURFACES

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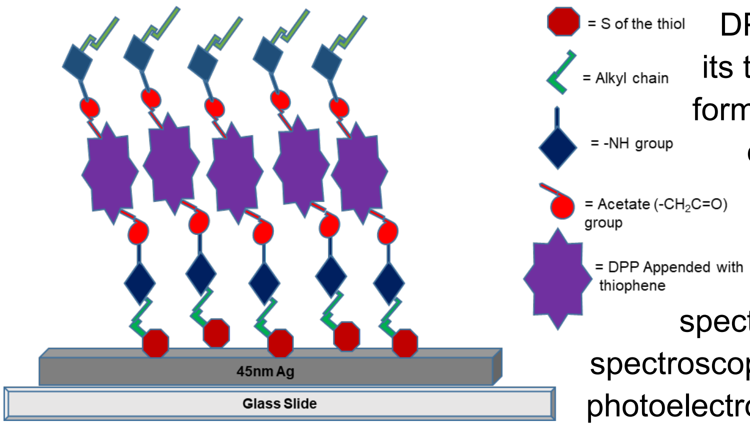
ABSTRACT

Organic electronics are increasingly investigated for next-generation manufacturing because of their tunable frontier molecular orbitals, unique optical and electronic properties, and they can be manufactured with lower carbon footprint than conventional MOSFET technologies. However, the problem that precludes their widespread adoption is that the relationship between the substrate, the electroactive organic semiconductor, their local chemical environment, their charge transfer mechanisms, the electronic coupling are not fully understood. One way of addressing this challenge is by investigating the mechanisms of charge and energy transport of model systems composed of organic semiconductors immobilized onto device-relevant interfaces. To do this, it is important to determine how each component in these electroactive molecules and their interactions with the inorganic substrate affect the device properties. Here, we study the electronic coupling of a self-assembled monolayer of diketopyrrolopyrrole-thiol (DPP-thiol) on a Ag substrate to understand these complex effects.



DPP has been selected because of its tunable FMOs, and its ability to form highly ordered films. We optimized conditions for the fabrication of DPP-monothiol monolayers, which were characterized by UV-visible spectroscopy, fluorescence spectroscopy, atomic force microscopy, X-ray photoelectron spectroscopy, and Raman microscopy. Enhanced Raman signals suggest exciton-plasmon coupling between the Ag surface and the DPP-monothiol. The coupling mechanism is being further investigated to understand the mechanism of charge transport in this system, which would in turn lead to the optimization of organic electronic devices.