

A PERSPECTIVE OF QUASIPARTICLE STATE IN ORGANIC CRYSTALS

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Understanding the impacts of strong electron-phonon coupling as well as weak electronic interaction on the electronic state is required to discuss the rich of functionality in organic molecular materials. Angle-resolved ultraviolet photoelectron spectroscopy (ARUPS) is known to be a powerful technique to study the electronic states. However, the experimental study of fine features in the highest occupied molecular orbital (HOMO) state has not been progressed till recently due to difficulty in the sample preparation, damages upon irradiation and so on, though it can offer a wide variety of key information, that is essential to comprehend charge-hopping transport and small-polaron related transport in the ordered monolayer film [1] as well as to coherent band transport in the molecular single crystal [2,3]. We present recent findings regarding on the precise measurements of electronic states for large aromatic organic molecular materials by using high-resolution ARUPS. A quasiparticle state is appeared differently in the UPS spectrum depending on the strength of the intermolecular interaction which is confirmed by the width of the energy band.

Keywords: rubrene, electron-phonon coupling, small polaron, photoelectron spectroscopy

References

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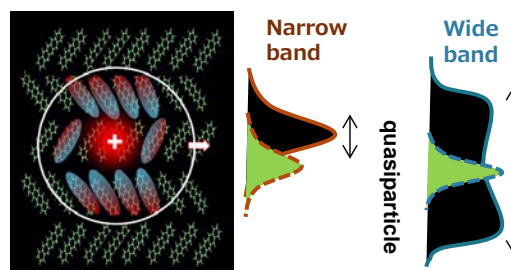


Fig. 1. HOMO-band features found as a polaron formation in organic crystals