

Characterization of properties at molecule/electrode interfaces in organic solar cells

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In organic solar cells (OSCs), an interface exists between the organic molecules and the electrode made of an inorganic material; the electrical properties of this interface affect the performance of the cells. One of the methods used to improve the electrical properties of an interface is to introduce a buffer layer between the organic molecules and the electrode. In heterojunction OSCs composed of phthalocyanine and C₆₀, bathocuproine (BCP) is used as a buffer layer between C₆₀ and metal cathode to improve the cell efficiency. The role of the BCP buffer layer, however, has not been clearly understood yet. In this talk, the influence of the electronic structure of the BCP/metal interface on the performance of OSCs is discussed [1].

In the second part of my talk, I would like to introduce the influence of an organic buffer layer on the structural properties of OSCs. Recently, we have developed a surface modification technique for controlling the molecular orientation of phthalocyanine using an organic buffer layer formed on the indium tin oxide substrate [2]. The optical and electrical properties of the orientation-controlled OSCs composed of phthalocyanine and C₆₀ will be demonstrated. Finally, the role of molecule/electrode interfaces on the performance of OSCs will be discussed.

[1] T.Sakurai et al., JAP **107**,043707,2010. [2] T.Sakurai et al., Nanosci.Nanotech.Lett. **1**,23,2009.