



Fig.1 Electrodeposition of PT films on ITO electrodes.

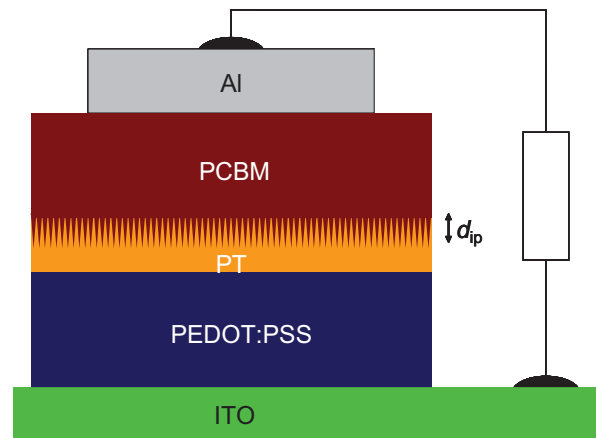


Fig.2 Partially interpenetrating donor/acceptor interface ($d_{ip}=9$ nm) in ITO/PEDOT:PSS/PT/PCBM/Al devices.

Content:

Organic photovoltaic devices have attracted much attention because of low-cost fabrication of light, flexible, and large scale devices. Most of these devices are based on the concept of “bulk heterojunction” in which donor and acceptor molecules form phase separation in nanometer scale. Most conducting polymers used as a donor molecule are high in material cost because they have long alkyl side-chains for improving solubility. The presence of alkyl chains also leads to low open circuit voltage in photovoltaic devices because electron-donating alkyl groups shift the HOMO level of conducting polymers to anodic values.

We have prepared organic photovoltaic devices using unsubstituted polythiophene (PT) as the donor material. Although PT is an infusible and insoluble solid, it can be formed on ITO electrodes through electrodeposition (Fig.1). The PT films have nanoporous structure through which acceptor molecules such as a fullerene derivative (PCBM) permeated into the film to form a partially interpenetrating donor/acceptor interface (Fig.2).

Keywords: conducting polymer, polythiophene, fullerene

E-mail: ytezuka@tokushima-u.ac.jp

Tel. +81-88-656-9435

Fax: +81-88-656-9435

HP : <http://www.opt.tokushima-u.ac.jp/lab/a-3/index.html>