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Title

Fabrication and characterization of fullerene/porphyrin bulk heterojunction solar cells

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Abstract

Fullerene/porphyrin bulk heterojunction solar cells were fabricated and, the electronic and optical properties were investigated. Effects of exciton-diffusion blocking layer of perylene derivative on the solar cells between active layer and metal layer were also investigated. Optimized structures with the exciton-diffusion blocking layer improved conversion efficiencies. Energy levels of the molecules were calculated and discussed. Nanostructures of the solar cells were investigated by X-ray and electron diffraction, which indicated formation of fullerene/porphyrin mixed crystals. Electronic structures of the molecules were investigated by molecular orbital calculation, and energy levels of the solar cells were discussed.

Key words

A. Fullerenes, B. Chemical synthesis, C. Electron microscopy, D. Electrical properties