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Initial Growth Mode and Nanostructure of Bulk Heterojunction Layers in Planar Type Metal Pthanlocyanine Molecules

Hyo Jung Kim[1], Ji Whan Kima[1], Hyun Hwi Lee[2], Byeondu Lee[3], Jang-Joo Kim[1]

[1]Department of Materials Science and Engineering and OLED Center, Seoul National University, Seoul 151-744, [2]Pohang Accelerator Laboratory, Pohang, Kyungbuk 790-783, Korea, [3]X-ray Science Division, Advanced Photon Source, Argonne National Laboratory, Illinois 60439, USA

ZnPc and CuPc molecules stacked similar way in the film, but showed different growth modes in thermal evaporation. The distribution of CuPc crystals did not change by the film thickness, whereas the distribution of ZnPc became random as the increase of the film thickness. The disc type nanograins of CuPc were quite regularly distributed at the initial growth regime and the regular distribution of nanograins was kept during the film growth. On the other hand, ZnPc consisted in ellipsoid shaped nanograins and the distribution of nanograins was not regular in the initial growth regime. The irregular distribution of nanograins changed to the regular mode at the later growth regime by showing structure factor in GISAXS measurement. The different initial nanograin distribution in ZnPc and CuPc was related to the different nanostructure in the mixed layer with C60 to form the bulk heterojunction.

Keywords: metal pthalocyanine, OPVs, bulk heterojunction, nanostructure, GISAXS