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Efficiency increase of P3HT:PCBM organic solar cells doped with iron oxide(II,III) nanoparticles

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Organic solar cells of P3HTPCBM have received the highest attention due to easy commercial availability. In the present work P3HT:PCBM bulk heterojunction solar cells are doped with different concentrations of surface coated Fe3O4 nanoparticles. At low nanoparticle concentrations (below 1 wt%) an increase in the power conversion efficiency (PCE) of up to 11% is found. This improvement in the device performance cannot be related to changes in the film morphology or in the film crystallinity, according to grazing incidence small and wide angle x-ray scattering experiments. Instead, an increase in the effective exciton lifetime is accounted as origin of the efficiency increase.

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