Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Fabrication of laser induced periodic surface structures on P3HT/ $PC_{71}BM$ photovoltaic blends T.A. EZQUERRA, J. CUI, A. RODRIGUEZ-RODRIGUEZ, M. HERNANDEZ, M.C. GARCIA-GUTIERREZ, A. NOGALES, IEM-CSIC, Madrid, Spain, M. CASTILLEJO, E. REBOLLAR, IQFR-CSIC, Madrid, Spain — Here we describe the conditions for fabrication of Laser Induced Periodic Surface Structures (LIPSS) over poly(3-hexylthiophene) (P3HT) spin-coated films. The structure and morphology of the LIPSS have been investigated by combining Atomic Force Microscopy(AFM), Conducting Atomic Force Microscopy (C-AFM) and Grazing Incidence X-ray Scattering at small angle (GISAXS) and wide angle (GIWAXS). Optimal LIPSS on P3HT are observed within a particular range of thicknesses and laser fluences. These conditions can be translated to the photovoltaic blend formed by the 1:1 mixture of P3HT and [6,6]-phenyl C71-butyric acid methyl ester (PC71BM) when deposited on an indium tin oxide (ITO) electrode coated with (poly(3,4 – ethylenedioxythiophene) : poly(styrenesulfonate) (PEDOT:PSS). Solar cells formed by using either a bilayer of P3HT structured by LIPSS covered by PC71BM or a bulk heterojunction with a P3HT:PC71BM blend structured by LIPSS exhibit generation of electrical photocurrent under light illumination. These results suggest that LIPSS could be a compatible technology with organic photovoltaic devices.

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Date submitted: 03 Nov 2016 Electronic form version 1.4