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Time-of-flight photoconductivity in polymer/graphene blends GVIDO BRATINA, EGON PAVLICA, SRINIVASA RAO PATHIPATI, ROBERT NAWROCKI, RAVEENDRA PENUMALA, Laboratory for Organic Matter Physics, University of Nova Gorica, Slovenia — We have used time-of-flight (TOF) photoconductivity measurements to assess the electric charge transport parameters in thin layers of poly(3-hexyl thiophene-2,5-diyl) (P3HT) mixed with single and multiple-layer graphene nanoflakes. Thin layers were cast from a solution and two co-planar metal electrodes were deposited by vacuum evaporation on top. An electric field was set up between the electrodes A laser pulse was used to photogenerate charge carriers near the biased electrode, and time dependence of the photocurrent (I(t)) was measured at the opposite electrode. I(t) curves were confronted to I(t)s obtained by a Gaussian-disorder Monte Carlo simulations, adapted to thin-film geometry. The simulations included a position-dependent electric field between two coplanar electrodes, which importantly affects the charge carrier transport through the blend between the electrodes. Comparison between the simulated and measured I(t)s resulted in values for charge carrier mobility, average charge velocity and variation of charge velocity. Our results show that the hole mobility in blends is increased by more than an order of magnitude in comparison to the hole mobility of a neat layers of P3HT

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