PRODUCTION OF VARIOUS SIZE ORGANIC PHOTOVOLTAIC CELLS WITH P3HT:PC61BM AS AN ACTIVE LAYER

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Due to climate changes and increasing global warming developing effective renewable energy sources is crucial. Organic photovoltaics (OPV), although demonstrate much lower efficiencies than its inorganic counterparts, still provide unique possibilities. They are much cheaper than silicon cells and moreover, can be deposited on flexible substrates, which opens potential for new niches such as wearable electronics and building incorporated panels.

Although promising, OPV suffers from relatively low efficiencies (c.a. $5-7\%$) that for time being are the main obstacle in the way for further commercialization. The two major reasons behind this behavior are short exciton diffusion lengths and very low carrier mobility in an active layer.

In this work we present organic solar cell structures with P3HT:PC61BM mixture in weight ratio 1:0.6 as the active layer. P3HT (Poly(3-hexylthiophene-2,5-diyl)) is a conductive polymer with absorption edge in the visible region working as an electron donor. PC61BM is a C_{60} fullerene derivative working as an acceptor. In our research we focus on the optimization of the deposition parameters, i.e. active layer annealing temperature, spin coating rotation speed and used solvents. Also, to test scalability of our method we prepare the cells onto indium-tin oxide substrates with two, substantially different sizes: 3 cm^2 and 25 cm^2.

As the result we present absorption spectra of the P3HT and PC61BM. Regarding solar cells, I-V characteristics, photocurrent and external quantum efficiency measurements will be discussed.