Density of Dark and Light-Induced Polaron States in Polymer PFO and Copolymer PFO-DBT Thin Films

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Abstract. The electronic structure of organic semiconductors has to be optimized to improve the performance of organic solar cells. In this work, we investigated the electronic structure of polymer PFO (Poly(9,9-dioctyl-9H-fluorene-2,7-diyl) and copolymer PFO-DBT (Poly[2,7-(9,9-dioctylfluorene)-alt-4,7-bis(thiophen-2-yl)benzo-2,1,3-thiadiazole]). The energy-resolved electrochemical impedance spectroscopy was used to study the influence of the thermal annealing on the electronic structure within the whole energetic interval from HOMO to LUMO. The UV light-induced polaron states were observed in both the PFO and PFO-DBT thin films. The lower density of both dark and polaron states was reached for spin-coated thin films after thermal annealing.