

Abstract Submitted  
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**Modeling photocurrent transients in organic solar cells** INCHAN HWANG, NEIL GREENHAM, Cavendish Laboratory, Department of Physics, University of Cambridge, J. J. Thomson Ave., Cambridge CB3 0HE, United Kingdom — We investigate the transient photocurrents of organic photovoltaic devices by numerical modeling of the drift-diffusion equations. Understanding charge transport in organic solar cells is one of the major interesting issues relevant to improving performance of organic devices. We demonstrate the simulation of the transient photocurrents in a response to a sharp turn-on illumination. Our results show the transient time in photocurrents is determined not only by free charge transport, but also by geminate charge pair dynamics. The dissociation probability of geminate charge pairs is a key parameter in determining the performance of organic devices, controlling the efficiency at low intensity, and also governing the fate of charge pairs formed by bimolecular recombination at high intensity. Bimolecular recombination appears to shorten the typical distance traveled by free charges from where they are generated to the electrode, leading to a reduced turn-on time at high intensity.

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