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Microwave absorption of free carriers in doped conjugated polymer films

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Flash photolysis time-resolved microwave conductivity (*fp*-TRMC) is a powerful spectroscopic tool for the detection of mobile charges in organic systems, such as conjugated polymers. We will report on a study of charge carrier generation in a number of polymer systems where the solid-state microstructure (SSM) of the thin films can be controlled using both molecular structure and processing conditions. By incorporating a low concentration of molecular acceptors, such as metallo-phthalocyanines, as well as substituted fullerenes and perylenes, the driving force for photoinduced electron transfer can be controlled through the excited state energy and the reduction potential. Our results indicate the importance of the crystalline phase of the polymer to stabilise and reduce the rate of recombination of the holes with the electrons that remain trapped on the acceptor. In addition, the role that the SSM plays on the stabilization of bound electron-hole pairs, or charge-transfer (CT) states will be examined.