Comparative studies of photochemical cross-linking methods for stabilizing the bulk hetero-junction morphology in polymer solar cells

We are here presenting a comparative study between four different types of functionalities for cross-linking. With relatively simple means bromine, azide, vinyl and oxetane could be incorporated into the side chains of the low band-gap polymer TQ1. Cross-linking of the polymers was achieved by UV-light illumination to give solvent resistant films and reduced phase separation and growth of PCBM crystallites in polymer:PCBM films. The stability of solar cells based on the cross-linked polymers was tested under various conditions. This study showed that cross-linking can improve morphological stability but that it has little influence on the photochemical stability which is also decisive for stable device operation under constant illumination conditions.

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