

유기태양전지의 열적 안정성 향상을 위한 전도성 고분자의 설계 및 개발

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Polymer based organic photovoltaics have attracted a great deal of attention due to the potential cost-effectiveness of light-weight and flexible solar cells. However, most BHJ polymer solar cells are not thermally stable as subsequent exposure to heat drives further development of the morphology towards a state of macrophase separation in the micrometer scale. Here we would like to show three different approaches for developing new electroactive polymers to improve the thermal stability of the BHJ solar cells, which is a critical problem for the commercialization of these solar cells. For one of the examples, we report a new series of functionalized polythiophene (PT-x) copolymers for use in solution processed organic photovoltaics (OPVs). PT-x copolymers were synthesized from two different monomers, where the ratio of the monomers was carefully controlled to achieve a UV photo-crosslinkable layer while leaving the π - π stacking feature of conjugated polymers unchanged. The crosslinking stabilizes PT-x/PCBM blend morphology preventing the macro phase separation between two components, which lead to OPVs with remarkably enhanced thermal stability.