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Photo-crosslinking and Post-Functionalization of Solution Assembled Conjugated Polymer Nanofibrils HYEONG JUN KIM, KAIST , MATTHEW SKINNER, ALEJANDRO BRISENO, TODD EMRICK , UMASS AMHERST, BUMJOON KIM, KAIST, RYAN HAYWARD, UMASS AMHERST
— Conjugated polymer nanofibrils produced by solution assembly represent efficiently charge transporting nanostructures with promise for improving the performance of organic electronics. Despite their advantages, they have inherent instability upon treatment with heat or solvents, limiting the types of processing steps that may readily be employed. We utilize an azide-functionalized P3HT copolymer (P3HT-azide) to produce robust photo-crosslinkable nanofibrils that can be post-functionalized without structural distortion or degradation of performance. The solution assembled P3HT-azide nanofibrils were successfully photo-crosslinked by exposure to UV light, as judged by their stability against high temperature and addition of a good solvent such as chlorobenzene. Furthermore, azide units remaining after photo-crosslinking were functionalized with polyethylene glycol (PEG) using the azide-alkyne click cycloaddition reaction, allowing for dispersion of nanofibrils in very polar solvents including methanol and water, while maintaining good charge transport properties.

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