

Self Assembled End-functionalized Polymers for High Performance Flexible Devices

박철민[†], 송지영, 조석만, Dhinesh B. Velusamy
연세대학교 신소재공학과
(cmpark@yonsei.ac.kr[†])

Supramolecular assembly of end-functionalized polymers, forming block copolymer-like supramolecules based on acid-base interaction, has utilized as a simple and facile method for generating functionalized nanoporous thin film. Different from the conventional covalent-bonded block copolymer system, those nanostructures have unique properties of easy cleavability of the polymer end-associations at mild etching process, providing the functional groups on the domain surfaces. In addition, we demonstrate that end-functionalized polymers can be utilized as an effective dispersant for separating multi-layered transition metal dichalcogenides (TMDs) into a single or a few layers. Our method is based on the non-destructive modification of TMD sheets with amine-terminated polymers. The universal interaction between amine and transition metal resulted in scalable, stable, and high concentration dispersions of a single to a few layers of numerous TMDs. The resulting films of TMD nanosheets with amine-terminated polymer exhibited excellent photo-detection performance upon near IR illumination, even when the films were severely deformed at a bending radius of approximately 200 μm .