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Supramolecular Approach towards Novel Applications: Battery, Band Gap and Gas Separation

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Abstract : It is well known that the block copolymer (BCP) can form a complex molecule, through non-covalent bonds such as hydrogen bond, ionic bond and co-ordination bond, with low molecular weight compound as well as with macromolecules, which provide vast applications, includes the alteration of morphology and properties of polymers. Hence we covered the research that, the importance of non-covalent bonds in increasing the non-favourable segmental interactions of the blocks was well examined by attaching and detaching the bonds between the BCP and additive. We also monitored the phase transition of block copolymer and effective interaction parameter (χeff) for Li-doped polymers using small angle x-ray scattering and transmission electron microscopy. The effective interaction parameter (χeff) between two block components was evaluated using Leibler theory based on the incompressible random phase approximation (RPA) for ionized BCP in a disordered state. Furthermore, conductivity experiments demonstrate that the ionic conductivity in the samples quenched from the different structures is morphology-independent, while it increases with increasing ion salt concentration. Morphological transitions, interaction parameter, and thermal stability also examined in quarternized block copolymer. D-spacing was used to estimate effective interaction parameter (χeff) of block components in weak and strong segregation regimes of ordered phase. Metal-containing polymer has been the topic of great attention in recent years due to their wide range of potential application. Similarly, metal- ligand complex is used as a supramolecular linker between the polymers giving rise to a 'Metallo-Supramolecule assembly. More precisely, functionalized polymer end capped with 2, 2':6', 2"- terpyridine ligand can be selectively complexed with wide range of transition metal ions and then subsequently attached to other terpyridine terminated polymer block. In compare to other supramolecular assembly, BCP involved metallo-supramolecule assembly offers vast applications such as optical activity, electrical conductivity, luminescence and photo refractivity.

Keywords : band gap, block copolymer, conductivity, interaction parameter, phase transition
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