Ionic Salt Effect on the Lamella Phase of PS-*b*-P2VP Copolymers

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Solid-state electrolytes have long been considered as suitable candidates owing to the simple and easy processes for rechargeable battery manufactures, compared to conventional liquid electrolyte counterparts. We report the transition behavior and the ionic conductivity of ion-doped amorphous block copolymer, based on two compositionally different polystyrene-*b*-poly(2-vinylpyridine) copolymers(PS-*b*-P2VPs) that can self-assemble into nanostructures, where P2VP block is ionophilic to lithium perchlorate($LiClO_4$). According to addition salt, the change for order-to-disorder transition temperatures(ODT) of block copolymer has a significant influence on d-spacing which is caused by the effective coordinative interaction between P2VP block and salt. Especially, for asymmetric PS-*b*-P2VP under lamellar morphology, the ionic conductivity by the addition of $LiClO_4$ was remarkably increased at higher temperatures due to the effective ionic coordination at the greater volume fraction of P2VP block component. This study suggests a simple approach to new solid-state BCP electrolytes.