

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Phase behavior of acid-bearing block copolymers containing ionic additives HA YOUNG JUNG, MOON JEONG PARK, Pohang Univ of Sci Tech — Ion-containing block copolymers, where one of the block is conducting ion and the other block is mechanically robust, are of interest for polymer electrolyte membranes. They can self-assemble into nanoscale morphologies in which the small amount of charges is known to make an impact on the phase behavior. Herein, we investigate the phase behavior of acid-bearing block copolymers with the addition of ionic liquids (ILs). In order to understand the role of thermodynamic interactions among the ionic moieties in determining the phase behavior, the ratio of cation and anion in ILs was systematically varied. Overall, the addition of ILs resulted in the increase in segregation strength of block copolymers, attributed to the selective incorporation of ILs in ionic domains. Interestingly, it has been further revealed the segregation strength can be largely modulated by varying the ratio of cation and anion in ILs. The results were rationalized by the balance of favorable thermodynamic interactions in IL-containing ionic phases and repulsive electrostatic interactions among oppositely charged ionic moieties. The effective Flory-Huggins interaction parameters were determined by fitting the scattering data of disordered phases based on the random phase approximation.

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Date submitted: 11 Nov 2016

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