

Impact of Molecular Configuration of Copolymer Gelators on Gel Electrolytes Performance

최위영, 문홍철[†]
서울시립대학교
(hcmoon@uos.ac.kr[†])

In this study, we investigate the correlation between the molecular configuration of copolymer gelators and the performance of the resulting ion gels by comparing two types of copolymers, poly(ethyl methacrylate-*ran*-styrene) (PEMA-*r*-PS) and disordered poly(ethyl methacrylate-*block*-styrene) (PEMA-*b*-PS). To ensure an accurate comparison, other factors related to gel properties such as molecular weight, PS fraction, and gel composition were fixed. When blended with 1-ethyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide ([EMI][TFSI]), both gelators based ion gels showed similar ionic conductivities. On the other hand, the PEMA-*r*-PS-based gel exhibited a higher elastic modulus (~220 kPa) than that (~103 kPa) of the PEMA-*b*-PS-based gel. To reveal the origin of the higher elastic modulus of PEMA-*r*-PS based gel, we studied the structures of ion gels using small angle X-ray scattering (SAXS) experiments. Moreover, we demonstrated PEMA-*r*-PS based gels to electrochromic devices (ECDs) and strain sensors.