

Abstract Submitted  
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**Structure-Properties Relationship in Proton Conductive Sulfonated Polystyrene-Polymethyl Methacrylate Block Copolymers.** LAURENT RUBATAT, CHAOXU LI, HERVE DIETSCH, University of Fribourg, Switzerland, ANTTI NYKAINEN, JANNE RUOKOLAINEN, Helsinki University of Technology, Finland, RAFFAELE MEZZENGA, University of Fribourg, Switzerland — We report on the dependence of proton conductivity on the morphologies of sulfonated polystyrene-poly(methyl methacrylate) (sPS-PMMA) diblock copolymers. Three diblock copolymers of varying molecular weight and block volume fraction were studied, for each one several sulfonation degrees of the PS block were considered. The investigation of the morphologies of the self-assembled sPS-PMMA diblocks was carried out by means of small angle neutron scattering and transmission electron microscopy. Depending on molecular weight and sulfonation degrees, isotropic phase (ISO), lamellar phase (LAM), cylindrical hexagonal phase (HEX) and hexagonally perforated lamellae (HPL) were observed. Proton conductivity, normalized by the volume fraction of the conductive domains (formed by PS, sPS and water), was shown to rise monotonically with the following sequence of morphologies: ISO to HEX to HPL to LAM.

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