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Effect of water uptake on morphology of polymerized ionic liquid block copolymers and random copolymers TSEN-SHAN WANG, University of Pennsylvania, YUESHENG YE, YOSSEF ELABD, Drexel University, KAREN WINEY, University of Pennsylvania — Dynamic studies of polymer morphology probe how the physical properties of polymerized ionic liquids are affected by the environment, such as temperature or moisture. For a series of poly(methyl methacrylate-*b*-1-[2-(methacryloyloxy)ethyl]-3-Butylimidazolium X^-) block and random copolymers with hydrophilic counterions (X^- = Br^-, HCO_3^-, OH^-), the introduction of water vapor to the system can swell the ionic liquid block, causing enlarged hydrophilic domains and swollen channels for ion conduction. This expected expansion of ionic liquid domains in humid environments can be used to intelligently design these copolymers for use in technological applications. The effect of water vapor exposure in these imidazolium-based acrylate polymers is studied by small-angle X-ray scattering. These morphology results will be discussed alongside complementary studies of water uptake and ion conductivity.

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