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Ionic Association States in Polyester Copolymer Ionomers HANQING MASSER, SHICHEN DOU, RALPH COLBY, PAUL PAINTER, JAMES RUNT, Penn State University — A series of random copolyester ionomers were previously synthesized from poly(ethylene oxide) (PEO600) and poly(tetramethylene oxide) (PTMO650) oligomers, separated by the lithium or sodium salt of a sulfonated phthalate. PEO exhibits better solvating ability, while PTMO based ionomers have somewhat lower T_g. By changing the ratio of PEO/PTMO, the polymer's ability to solvate ions at the same ion content was varied, in order to explore the trade-off between ion solvation and lower T_g. Ionomers with different PEO/PTMO ratios were investigated by FTIR spectroscopy. The results show a systematic change in the ion association states and ion aggregation geometries with PEO/PTMO ratio and temperature. Ionomers with sodium cations have more ion pairs compared to the Lithium ionomers at the same PEO/PTMO ratio, which correspond to the higher dielectric constants in the sodium ionomers. These findings agree with previous X-ray scattering and dielectric relaxation spectroscopy results that the system microphase separates into PEO-rich and a PTMO-rich microphases and the majority of the cations reside in the PEO-rich microphase.

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