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Synthesis and Properties of a Precision Sulfonated Trimethylene-Styrene Polyelectrolyte. JUSTIN KENNEMUR, WILLIAM NEARY[1], MICHELE BOHLMANN[2], AARON KENDRICK[3], Florida State Univ — We recently reported successful ring-opening metathesis polymerization of 4-phenylcyclopentene to afford a precision ethylene-styrene type copolymer with a phenyl branch at exactly every fifth carbon along the backbone following mild hydrogenation of the backbone olefins. (http://dx.doi.org/10.1002/marc.201600121) Compared to polystyrene, this material shows a markedly reduced glass transition temperature ($T_g \approx 17$ C) and remains amorphous. We have now extended the function of this polymer via sulfonation of the phenyl branches to produce a precision polyelectrolyte with an ionic charge spacing at every fifth carbon along the chain. The reduced yet precise charge density coupled with the low T_g of the native material translates into a variety of properties that are unique to this system and potentially useful as an addition to the limited set of available polyelectrolyte materials. Synthetic aspects in addition to thermal and mechanical properties will be discussed.

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