Electronic Supplementary Material (ESI) for RSC Advances.

Design, Synthesis, and Characterization of Lightly Sulfonated Multigraft Acrylate-based Copolymer Superelastomers

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Molecular Characterization

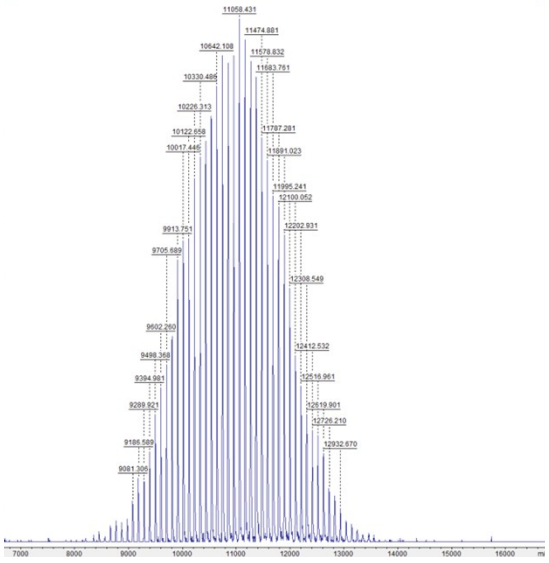

Figure S1: MALDI-TOFF of PS macromonomer.

Thermal Analysis

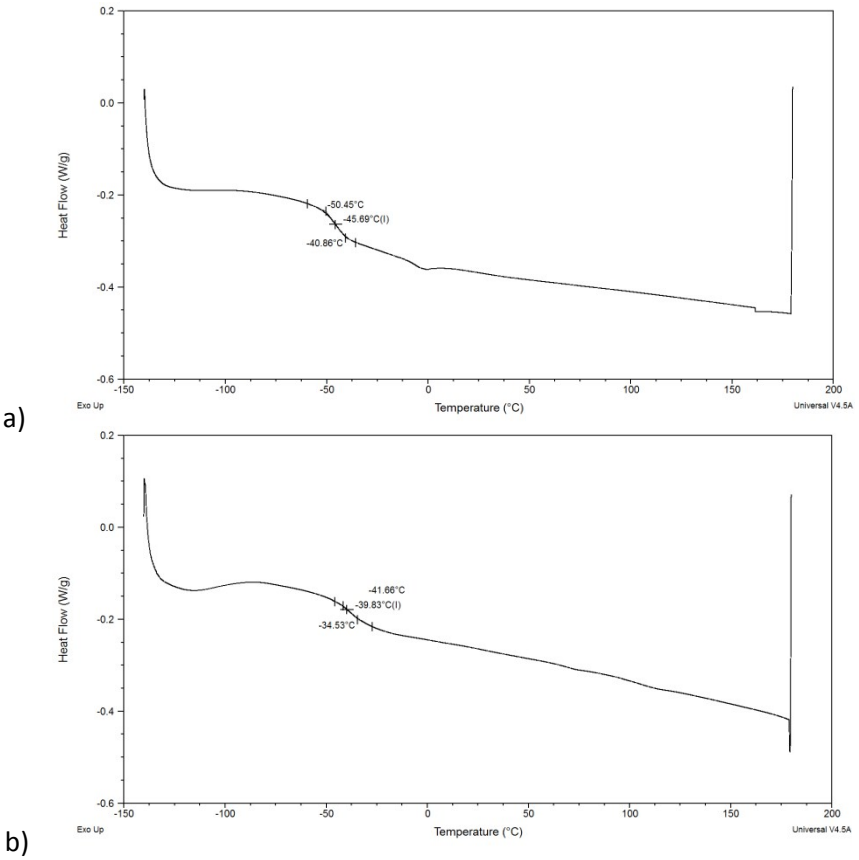

Figure S2: DSC for a) PSm-PnBA-1 and b) PSSm-PnBA-1 multigraft copolymers.

Extentional Rheometry

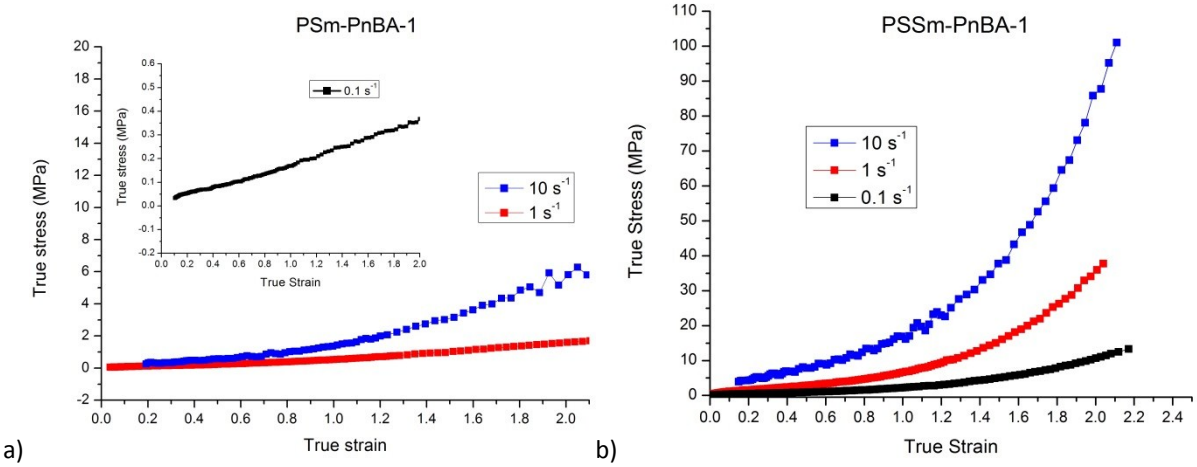

Figure S3: Non-linear viscoelastic data for a) PSm-PnBA-1 and b) PSSm-PnBA-1 for 0.1, 1 and 10 s^{-1}.

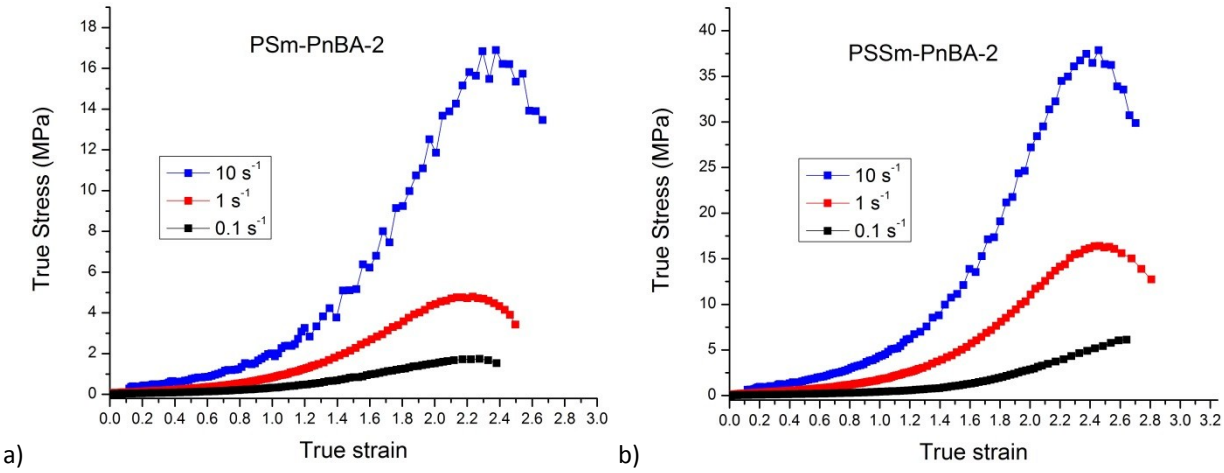

Figure S4: Non-linear viscoelastic data for a) PSm-PnBA-2 and b) PSSm-PnBA-2 for 0.1, 1 and 10 s^{-1}.

True strain ε is equal to Hencky strain ϵ which can be related to the stretching ratio λ using the following equation: $\epsilon = \ln \lambda$. Consequently, stretching ratio will be: $\lambda = e^{\epsilon}$ and for $\epsilon = 3$ we get $\lambda = 20.08$, which means 2008% elongation (since $\lambda = L/L_0$ with L = length of the specimen at break and L_0 = initial length of the specimen) which is pretty close to our experimental value of 2060% for PSm-PnBA-1 (non-sulfonated) and strain rates 1 s^{-1} and 10 s^{-1}.

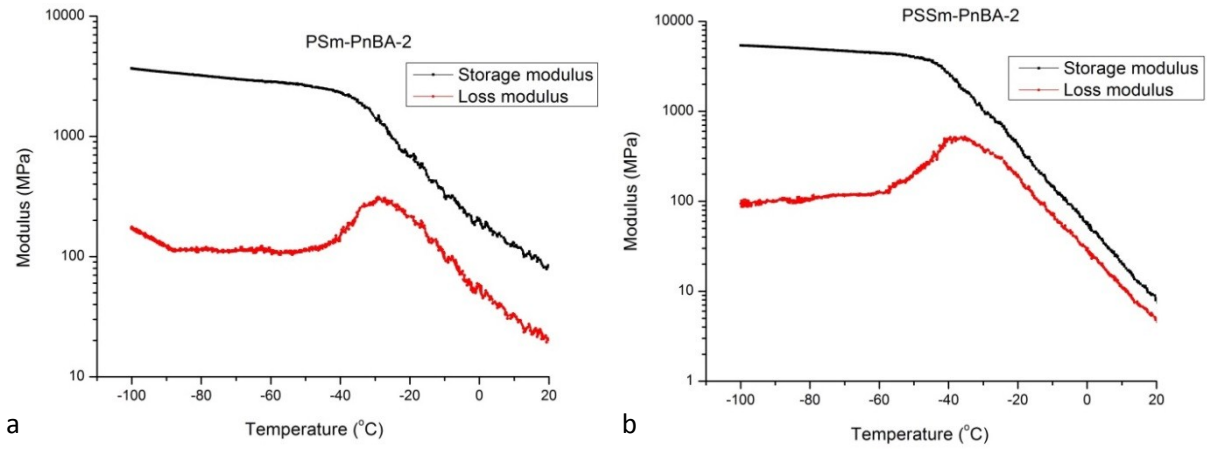

Figure S5: Storage and loss modulus of a) PSm-PnBA-2 and b) PSSm-PnBA-2 for -100 to 20°C.

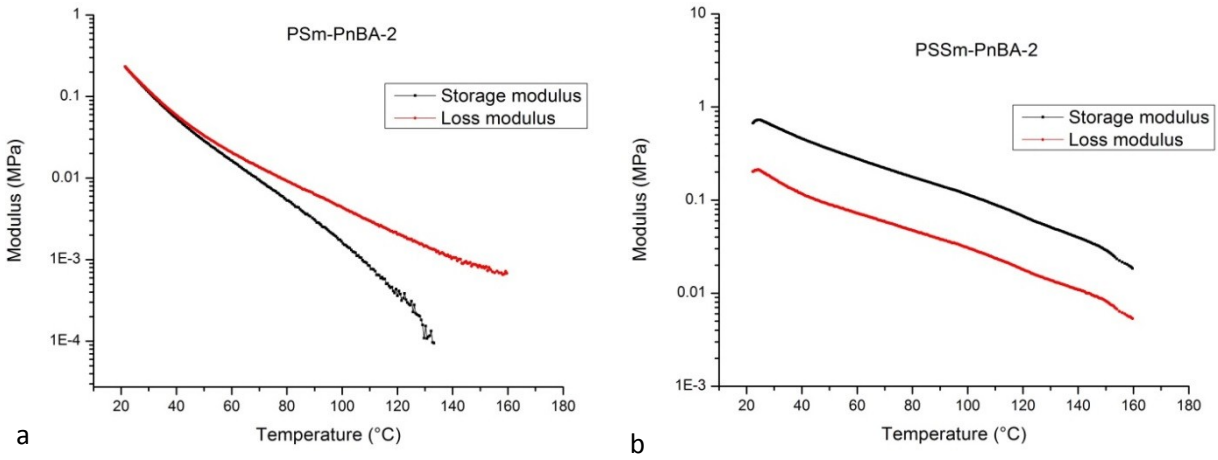

Figure S6: Storage and loss modulus of a) PSm-PnBA-2 and b) PSSm-PnBA-2 for 20 to 160^{o}C.