

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Clustering Effects on Dynamics in Ionomer Solutions: A Neutron Spin Echo Insight¹ DVORA PERAHIA², SIDATH WIJESINGHE, MANJULA SENANAYAKE, ANURADHI WICKRAMASINGHE, SUPUN S MOHOT-TALALAGE , Clemson University, MICHAEL OHL, Juelich Centre for Neutron Science, Germany — Ionizable blocks in ionomers associate into aggregates serving as physical cross-links and concurrently form transport pathways. The dynamics of ionomers underline their functionality. Incorporating small numbers of ionic groups into polymers significantly constraint their dynamics. Recent computational studies demonstrated a direct correlation between ionic cluster morphology and polymer dynamics.¹ Here using neutron spin echo, we probe the segmental dynamics of polystyrene sulfonate (PSS) as the degree of sulfonation of the PSS and the solution dielectrics are varied. Specifically, 20Wt% PSS of 11,000 g/mol with polydispersity of 1.02 with 3% and 9% sulfonation were studies in toluene (dielectric constant $\epsilon = 2.8$), a good solvent for polystyrene, and with 5Wt% of ethanol ($\epsilon = 24.31$) added. The dynamic structure factor $S(q,t)$ was analyzed with a single exponential except for a limited q range where two time constants associated with constraint and mobile segments were detected. $S(q,t)$ exhibits several distinctive time and length scales for the dynamics with a crossover appearing at the length scale of the ionic clusters. 1)Agrawal et. al Phys. Rev. Lett. **116**, 158001

¹NSF DMR 1611136

²Cannot Present on Friday

Dvora Perahia
Clemson University

Date submitted: 11 Nov 2016

Electronic form version 1.4