

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Relevance of Solvent Characteristics on Ion-Binding and the Structure Formation of Neutral Polymers in Electrolyte Solutions ILHEM FAIZA HAKEM, Carnegie Mellon University, JYOTSANA LAL, IPNS, Argonne National Laboratory, MICHAEL BOCKSTALLER, Carnegie Mellon University — Polymers carrying functional groups constituted of heteroatoms are omnipresent in biology and polymer technology, for example in the development of solid state polymer electrolytes. When dissolved in polar solvents, these polymers can coordinate ions that result in an effective transformation of the neutral polymer into a weakly charged polyelectrolyte as indicated by the characteristic changes in the polymers solution characteristics. In our contribution we discuss the implications of solvent characteristics – i.e. dielectric constant and hydrogen bonding capacity – and the ion-strength of the added electrolyte on the polymer-ion coordination as well as polymer solution characteristics. A mean-field model to predict the amount of ion-coordination is presented and validated for the particular case of poly(oxy ethylene)/salt solutions. The Random Phase Approximation (RPA) is applied to extract quantitative information about the coordination of ions to the polymer in solution from small-angle neutron scattering (SANS) data.

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Date submitted: 09 Jan 2006

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