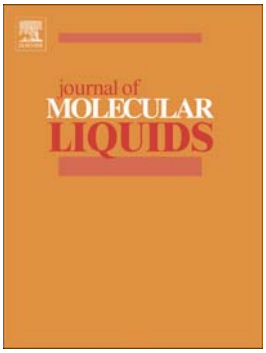

Influence of some inorganic salts on the intrinsic viscosity of poly(acrylic acid) in aqueous solutions

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PII: S0167-7322(16)31849-9
DOI: doi: 10.1016/j.molliq.2016.08.100
Reference: MOLLIQ 6261

To appear in: *Journal of Molecular Liquids*

Received date: 10 July 2016
Revised date: 24 August 2016
Accepted date: 26 August 2016

Please cite this article as: Abbas Mehrdad, Maryam Taleb-Abbasi, Influence of some inorganic salts on the intrinsic viscosity of poly(acrylic acid) in aqueous solutions, *Journal of Molecular Liquids* (2016), doi: 10.1016/j.molliq.2016.08.100

Influence of some inorganic salts on the intrinsic viscosity of poly(acrylic acid) in aqueous solutions

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Abstract

In this work, the effect of temperature, concentration of sodium sulfate and potassium sulfate on the intrinsic viscosity of poly(acrylic acid) were investigated. Our data shows excellent conformance with the Wolf equation. The addition of salt screens the electrostatic repulsions between charges along the backbone of the polyelectrolyte chain. Consequently the intrinsic viscosity of PAA was decreased by increasing concentration of salt. Also the results reveal that the reduction of intrinsic viscosity of PAA in the presence of sodium sulfate is more than those of potassium sulfate. Potassium cation shows a screen effect less than sodium cation. Therefore the intrinsic viscosity of PAA in the presence of potassium sulfate is more than those of sodium sulfate. The flow activation energy was evaluated by Arrhenius equation. The flow activation energy data was correlated to polymer concentration with a meaningful equation. The UV-Vis spectra of poly(acrylic acid) shows that the absorption intensity of PAA was decreased with addition of sodium sulfate or potassium sulfate. The structure of the extended polymer chains reformed to random-coil conformation in the presence of salt, thus the value of electric multipole moment decreased. Consequently the absorption intensity of PAA was decreased with addition of sodium sulfate or potassium sulfate.

Key words: poly(acrylic acid); polyelectrolyte; intrinsic viscosity; multipole moment

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