

## Accepted Manuscript

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PII: S0021-9614(18)30257-X  
DOI: <https://doi.org/10.1016/j.jct.2018.03.030>  
Reference: YJCHT 5375

To appear in: *J. Chem. Thermodynamics*

Received Date: 17 January 2018  
Revised Date: 29 March 2018  
Accepted Date: 30 March 2018

Please cite this article as: N. Ebrahimi, B. Farahbod, R. Sadeghi, Salting-in and salting-out effects of organic and inorganic ammonium salts on the aqueous polymer solutions, *J. Chem. Thermodynamics* (2018), doi: <https://doi.org/10.1016/j.jct.2018.03.030>

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## Salting-in and salting-out effects of organic and inorganic ammonium salts on the aqueous polymer solutions

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### ABSTRACT

This paper accomplishes a broad survey of the salting effects of different ammonium salts on the aqueous polymer solutions. In order to cover a wide range of hydrophilic and hydrophobic nature of solutes, salts including ammonium chloride ( $\text{NH}_4\text{Cl}$ ), ammonium bromide ( $\text{NH}_4\text{Br}$ ), tetraethyl ammonium bromide (TEAB), tetrapropyl ammonium bromide (TPAB), tetrabutyl ammonium bromide (TBAB), tetrabutyl ammonium chloride (TBAC), and dodecyl trimethyl ammonium bromide (DTAB), and polymers polyethylene glycol (PEG400 and PEG10000) and polypropylene glycol (PPG400 and PPG1000) have been used. In the first part of this work, cloud point temperatures ( $T_C$ ) for binary system of PPG1000 in pure water and for ternary systems of PPG1000 in aqueous solutions of ammonium salts have been determined by visual observation. It is shown that while the inorganic ammonium salts ( $\text{NH}_4\text{Cl}$  and  $\text{NH}_4\text{Br}$ ) reduce the  $T_C$  values of PPG1000 aqueous solutions (salting-out effect), the organic ammonium salts (TEAB, TPAB, TBAB, TBAC, DTAB) because of hydrocarbon portions in their structure favourably interact with PPG1000 and elevate the  $T_C$  values (salting-in effect). The values of salting coefficient and energetic parameters of clouding process have been calculated. In the second part of this work, the isopiestic equilibrium has been investigated for several ternary {polymer + ammonium salt + water} systems at 298.2 K. Three different types of constant water activity curves deviation from the linear isopiestic relation (LIR) were observed: negative deviations for systems which undergo

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