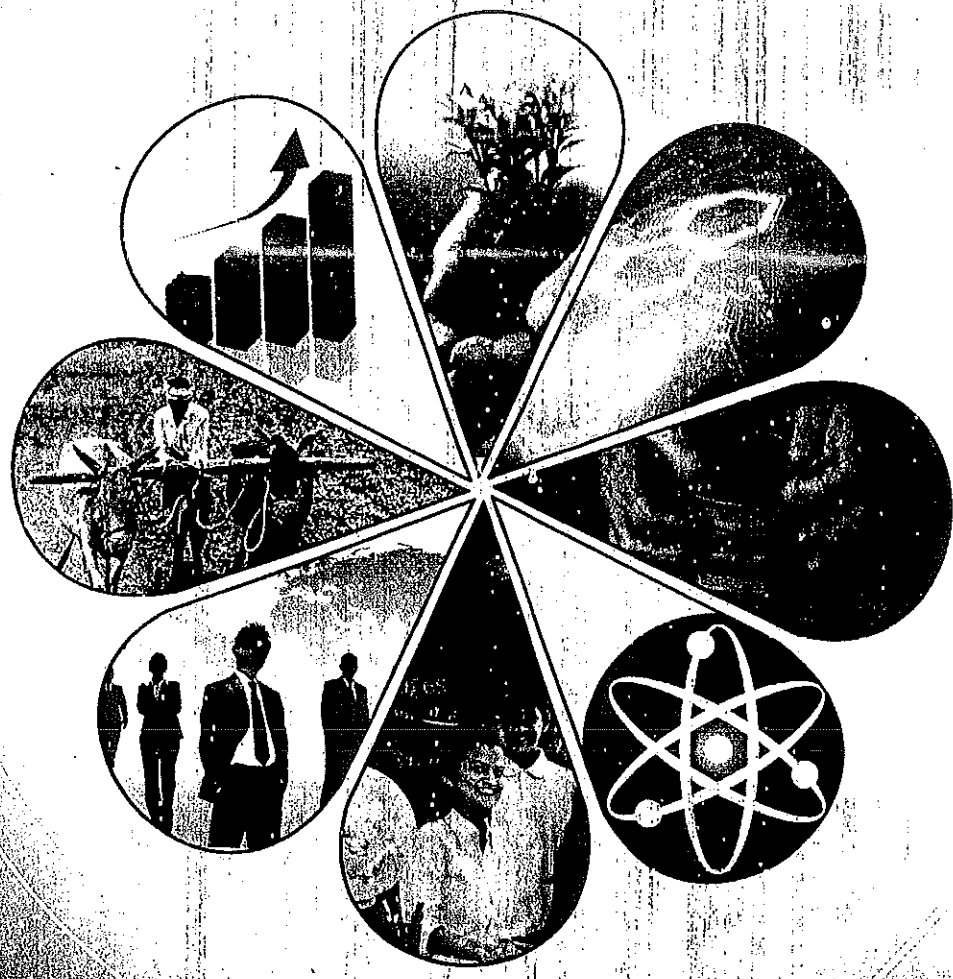


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Solvolysis of potassium chlorate in aqueous potassium chloride at different temperatures

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The densities and viscosities of KClO_3 in water and 0.4% potassium chloride have been measured at the temperatures (298.15, 303.15, 308.15 and 313.15) °K. The apparent molar volumes (\bar{V}_v, \bar{V}_v^0) and viscosity B coefficients are obtained from experimental data. The limiting apparent molar volumes (\bar{V}_v^0, \bar{V}_v^0) and experimental slopes (S_v, S_v^0) derived from the Masson's equation has been reported and interpreted in terms of ion-solvent and ion-ion interactions.

Key Words : KClO_3 , density, viscosity B-coefficient, apparent molar volumes.

Introduction:

The design and operation of industrial processes that involve electrolyte solutions require knowledge of rigorous models or experimental data to represent the non ideality of the mixtures. Accurate predictions of densities and viscosities of mixed electrolyte solutions are of great importance in industry.¹ New measurements have continued to be made, focusing for example on the components of seawater and brines²⁻⁴ or on extreme conditions such as very low or very high temperature.⁵⁻¹¹ Studies on viscosities, densities, and apparent molar volumes of ionic solutions assist in characterizing the structure and properties of solutions. Various types of interactions exist between the ions in solutions, and of these, ion-ion and ion-solvent interactions are of current interest in all branches of chemistry. The present investigation has been undertaken to enrich the data and provide better understanding of the nature of KClO_3 in presence 0.4% KCl and water.

Experimental Section:

Potassium chlorate and potassium chloride (all A.R.) were used as such; only after drying over P_2O_5 in a desiccator for more than 48 hr. The aqueous solutions of KClO_3 and 0.4% KCl were made by mass, and conversion of molality into molarity was done.

Density measurements:

A bicapillary pycnometer having a bulb volume of 10 cm^3 and an internal diameter of the capillary of about 0.2 cm was calibrated at (298.15, 303.15, 308.15 and 313.15) °K by measuring the densities of pure water. The density was measured with an uncertainty of $\pm 1.48 \times 10^{-4} \text{g.cm}^{-3}$. The densities of KClO_3 solutions in 0.4% aqueous KCl and pure water were measured by calibrated bicapillary pycnometer at different temperatures.