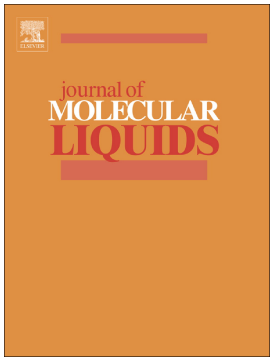

Thermodynamic models for Alloxan solubility in various solvents at different temperatures

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PII: S0167-7322(17)32016-0
DOI: doi: 10.1016/j.molliq.2017.06.107
Reference: MOLLIQ 7553

To appear in: *Journal of Molecular Liquids*

Received date: 9 May 2017
Revised date: 23 June 2017
Accepted date: 23 June 2017

Please cite this article as: S. Baluja, Divyata Lava, Asmita Hirpara, K. Bhesaniya , Thermodynamic models for Alloxan solubility in various solvents at different temperatures, *Journal of Molecular Liquids* (2017), doi: 10.1016/j.molliq.2017.06.107

Thermodynamic models for Alloxan solubility in various solvents at different temperatures

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Abstract

The solubility of Alloxan in methanol, ethanol, ethane-1, 2 diol, water, acetone and tetrahydrofuran was measured by gravimetric method over a temperature range (293.15 to 323.15) K at atmospheric pressure. The solubility increases non-linearly with temperature in all the studied solvents. Further, in protic solvents, solubility is maximum in methanol and minimum in ethane-1, 2 diol whereas in the selected non protic solvents, solubility is greater in tetrahydrofuran than in acetone. The experimental data were correlated with modified Apelblat and Buchowski-Ksiazczak equations. The calculated results show good agreement with the experimental data. Some apparent thermodynamic parameters such as dissolution enthalpy, Gibb's free energy, and entropy of mixing have also been calculated. The evaluated thermodynamic parameters are found to be positive. The positive enthalpy and Gibb's free energy indicate endothermic and spontaneous dissolution of compounds. The positive entropy suggests entropy-driving dissolution process.

***Keywords*:** Alloxan, solubility, thermodynamic parameters, Apelblat and Buchowski-Ksiazczak models,

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1. Introduction

Diabetes mellitus has been considered as one of the major health concerns all around the world today [1,2]. One of the most potent methods to induce experimental diabetes mellitus is chemical induction by Alloxan which is a well known diabetogenic agent [3-6]. Alloxan is an oxygenated pyrimidine derivative and its IUPAC name is 2, 4, 5, 6-pyrimidinetetrone. It causes selective necrosis of the β-cells of pancreatic islets.