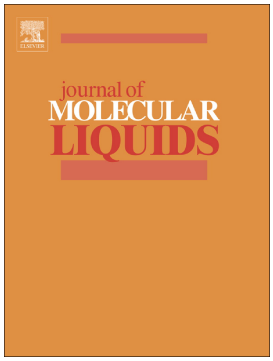

Temperature-dependent solubility of β-Alanine in different binary solvents from 288.15K to 323.15K: Measurement and thermodynamic modeling

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Temperature-dependent solubility of *β*-Alanine in different binary solvents from 288.15 K to 323.15 K: Measurement and Thermodynamic modeling

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ABSTRACT: The solid - liquid equilibrium solubility of *β*-Alanine in three different binary solvent mixtures, including (methanol + water), (ethanol + water) and (DMF + water), was measured by a gravimetric method at temperatures ranging from 288.15 K to 323.15 K. It is found that the solubility of *β*-Alanine is positively correlated with temperatures at a given solvent composition and negatively correlated with the molar fraction of organic solvents. The solid - liquid equilibrium data of *β*-Alanine was fitted by the modified Apelblat equation, CNIBS/R-K equation and NRTL model. It turned out that all the selected thermodynamic models could give satisfactory results. Moreover, the apparent thermodynamic properties of the dissolution process, including the standard Gibbs free energy, enthalpy, and entropy were calculated based on the van't Hoff analysis. The corresponding results indicate that these dissolving processes of *β*-Alanine in the selected solvents are endothermic and entropy-driving.

Keywords: *β*-Alanine; Solubility; Polarity; Thermodynamic model; Thermodynamic properties

1. Introduction

β-Alanine (chemically called 3-amino propanoic acid $C_3H_7NO_2$, CAS Registry No.107-95-9, and molecular structure as shown in Fig. 1), is the simplest and only