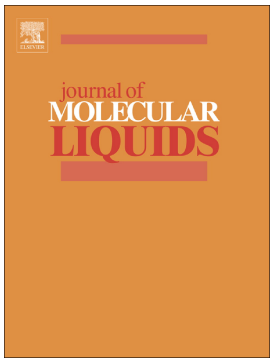

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Uncover the effect of solvent and temperature on solid-liquid equilibrium behavior of L-norvaline

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ABSTRACT: ~~Data on (solid + liquid) equilibrium of L-norvaline in binary solvents will provide essential support for theoretical basis and industrial design. In this work,~~ The solid-liquid equilibrium (SLE) of L−norvaline in three different binary solvents, including water + methanol, water + ethanol and water + 2-propanol, was determined by employing a gravimetric method over temperatures from 283.15 K to 318.15 K. It is found that the equilibrium solubility of L-norvaline in the mixed solvents increases with rising temperature at constant solvent composition and decreases with the increasing molar fraction of organic solvents. Moreover, the dissolving capacity of L-norvaline in the three binary solvent mixtures at constant temperature can be ranked as (methanol + water > ethanol + water > 2-propanol + water) in general. Furthermore, ~~the polarity of binary solvent mixtures was calculated by the sum law of cube roots of dielectric constant, and the dielectric constants changed with the composition of binary solvents simultaneously. Thus,~~ a model which can be called polar equation was applied to quantitatively describe the relationship between solubility and polarity of solvent mixtures. The results demonstrate that the increasing polarity of the binary solvents can enhance the solubility of L-norvaline. Besides, the experimental solubility was well correlated by the modified Apelblat equation, λh equation, ~~as well as~~ and NRTL model, with the maximum ARD% values: 1.89%, 3.48%, and 6.42%, respectively. Additionally, the mixing thermodynamic properties of L-norvaline in