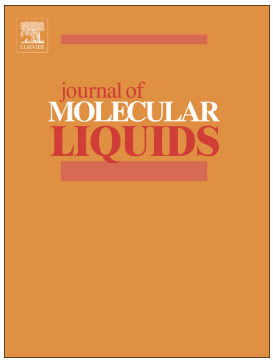

Temperature and solvent dependent thermodynamic behavior of tetrabromobisphenol A

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Temperature and solvent dependent thermodynamic behavior of tetrabromobisphenol A

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ABSTRACT: The mole fraction solubility of tetrabromobisphenol A in nine pure solvents and two binary solvents was determined using the gravimetric method. Different thermodynamic models were employed to analyze the dissolution behavior of tetrabromobisphenol A in pure and binary solvents. In addition, the analysis of the thermodynamic properties implies that the lower mixing Gibbs free energy is, the stronger interaction between solute and solvent is, leading to higher solubility.

Keywords: Tetrabromobisphenol A; Solubility; Thermodynamic property; Thermodynamic model

1. Introduction

Tetrabromobisphenol A (TBBPA, $C_{15}H_{12}Br_4O_2$, CAS Registration No. 79-94-7, Figure 1) is the most widely used brominated flame retardants (BFRs), covering around 60% of the world's total production and usage of BFRs market [1, 2]. It can be used as reactive flame retardant as well as additive flame retardant [3]. Furthermore, it is also a raw material [4] for producing other BFRs such as tetrabromobisphenol A bis (2-hydroxyethyl ether), tetrabromobisphenol A dibromopropylether, tetrabromobisphenol A bis (allylether) and tetrabromobisphenol A carbonate oligomers.

In general, tetrabromobisphenol A is prepared through the bromination of bisphenol A [5, 6]. Water is added before or after the synthesis to separate the precipitated