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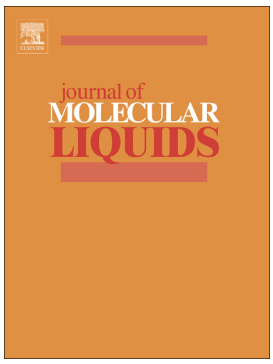


# Volumetric and viscometric properties of aqueous solutions of sodium amino acids at T=(293.15 to 333.15) K

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# Volumetric and viscometric properties of aqueous solutions of sodium amino acids at $T$ = (293.15 to 333.15) K

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## ABSTRACT

The densities and viscosities of aqueous solutions of sodium glycinate, sodium L-alaninate, sodium L-valinate, sodium L-threoninate and sodium L-argininate were measured at $T$ = (293.15 to 333.15) K under the atmospheric pressure. The effects of temperature and concentration on the densities and viscosities of binary solutions were investigated. The volumetric and viscometric properties such as the apparent molar volume ($V_\varphi$), the limiting partial molar volume ($V_\varphi^0$), the viscosity *B*-coefficient (*B*) and the activation energy for viscous flow (*Ea*) were calculated by the experimental density and viscosity data and analyzed based on the molecular structure and intermolecular interaction. Moreover, the group contribution method was utilized to study the limiting partial molar volume ($V_\varphi^0$), and the contributions of the end group (-$NH_2$,-COONa), CH- group, $CH_2$- group, $CH_3$- group, OH- group and CNHNH$NH_2$- group to the limiting partial molar volume ($V_\varphi^0$) were obtained. The results show that all these groups have positive contributions to the limiting partial molar volume ($V_\varphi^0$).

*Keywords*: Sodium amino acid; Density; Viscosity; Apparent molar volume; *B*-coefficient

## 1. Introduction

In recent years, the global warming stemming from greenhouse effect has become one of the focuses of worldwide concerns. Among all kinds of greenhouse

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