

Past and Present Research Systems of Green Chemistry

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Thermodynamics and topological investigations of ternary mixtures containing ionic liquid with organic solvents: Excess molar volumes and excess isentropic compressibilities

Vinod Kumar, S Solanki and S Bhagour
M D University, India

Large quantities of liquids or their mixtures are used as solvents for numerous processes in chemical and related industries; thus the challenge of non-harmful solvents, because of new environmental regulations, has promoted great developments of innovative products like ionic liquids to protect the environment. Over the last decades liquids or their mixtures have been characterized on the basis of their thermodynamic properties. Consequently, the need for a deep knowledge of thermodynamic properties of liquid mixtures has appeared driven both by technological and social demands. Now a day, the interest for industrial multi-component processes is increasing and thus, thermodynamic studies of ionic liquid mixtures are being developed in parallel to industrial advances, contributing to design, improvement and output of the processes. In view of this, we report densities and speeds of sound data of 1-ethyl-3-methylimidazolium tetrafluoroborate (1) + water (2) + formamide or N,N- dimethylformamide (3) ternary mixtures over entire composition range at 293.15, 298.15, 303.15, 308.15 K. The heat capacities, C_p of 1-ethyl-3-methylimidazolium tetrafluoroborate, water, formamide and N,N- dimethylformamide have also been measured at 293.15, 298.15, 303.15, 308.15 K using micro differential scanning calorimeter. The measured data have been utilized to determine excess molar volumes and excess isentropic compressibilities values. The topology of the constituent molecules (Graph theory) has been utilized to determine excess molar volumes and excess isentropic compressibilities values. Results obtained indicate that experimental and calculated values are in good agreement.

Biography

Vinod Kumar did his MSc from M.D. University, Rohtak (INDIA) in the year 1979 with specialization in Physical chemistry. He did his PhD from the same University in the year 1983. He joined the Department of Chemistry, M.D. University, Rohtak as Senior Lecturer in 1989 from where he elevated to the post of Professor in 2005. At present he is Head of the Department. He has published 125 research papers in journals of international repute. He has attended about 40 national/international conferences and supervised 15 PhD students. His major area of research is "Thermodynamics of liquid mixtures".

v_sharmachem58@rediffmail.com

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