

A New Class of Ionic Solvents, Electrolytes and Engineering Fluids Based on 1,3-Alkylmethyl-1,2,3-benzotriazolium Salts

Ahmad Mudzakir

Department of Chemistry Education, Indonesia University of Education (UPI)

Jl. Dr. Setiabudhi 229 Bandung 40154, Indonesia

Tel/fax: +62222001108

(e-mail: zakir66@upi.edu)

Abstract

A new series of ionic liquids based on 1,3-alkylmethyl-1,2,3-benzotriazolium cation has been prepared. The spectroscopic, physical and electrochemical characteristics of this family of salts have been investigated with respect to potential usage as ionic solvents, electrolytes and engineering fluids. Incorporation of diverse anions including: weak coordinating anions, organosulfonyl amides and pseudohalides with this benzotriazolium cation produces ionic liquids with advantageously low melting points and good thermal stability. Thermal analyses of these very stable salts included the determination of melting points (29 to 143 °C) and decomposition temperatures (up to 315 °C). The electrochemical windows of representative benzotriazolium species have been investigated by cyclic voltammetry and determined to be ~ 3.5 V. The X-ray single crystal and spectroscopic studies revealed that weak hydrogen-bonding interactions between the benzotriazolium ring protons and the anions are present both in the solid state as well as in solution.

Key Words: ionic liquids, X-ray single crystal, thermal and electrochemical analysis and 1,3-alkylmethyl-1,2,3-benzotriazolium salts.