A Review of Room Temperature Ionic Liquids (RTILs): Past, Present and Future Works

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ABSTRACT

Solvents have been known to be important and play a crucial role in the extraction, separation, and synthesis process due to their innate physicochemical properties. Recently, ionic liquids like room temperature ionic liquids (RTILs) have gained popularity because of their high chemical and thermal stability, density, viscosity, low electrical conductivity, low toxicity, and high reusability. RTILs are a class of ionic systems, usually consisting of salts of organic cation and inorganic anion whose melting temperature falls below the conventional limit of 100 °C. In this review article, past and present studies of RTILs available in the literature are presented as well as its future trends. This paper gives an overview of the discovery and development of RTILs, the fundamental aspects and properties, synthesis, route mechanisms, and their applications in diverse scientific fields. This also includes the purification and recovery of the RTILs as a solvent and catalysts like crystallization, distillation, and extraction. In addition, an emphasis on research gaps and future works to ventures for these green solvents addressing its high cost and unavailability, toxicity, and the lack of biodegradability data which serves a starting platform for both researchers and scientists. Finally, the results presented in this paper serve as helpful information for future research to improve the current state of RTILs in terms of their applicability.

Keywords: room temperature ionic liquids; green solvents; sustainability; green chemistry