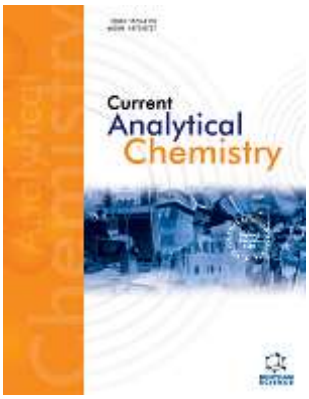

Ionic Liquids in Analytical Chemistry: Applications and Recent Trends

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Background: Ionic liquids (ILs) are a unique class of compounds consisting exclusively of cations and anions that possess distinctive properties such as low volatility, high thermal stability, miscibility with water and organic solvents, electrolytic conductivity and non-flammability. Ionic liquids have been defined as "design solvents", because it is possible to modify their physical and chemical properties by appropriately choosing cations and anions, in order to meet the specific characteristics based on their potential application.

Introduction: Due of their tunable nature and properties, ILs are considered as the perfect candidates for numerous applications in analytical chemistry including sample preparation, stationary phases in liquid or gas chromatography, additives in capillary electrophoresis, or in mass spectrometry for spectral and electrochemical analysis. In the last years, the number of publications regarding ILs has rapidly increased, highlighting the broad applications of these compounds in various fields of analytical chemistry.

Results: This review first described the main physico-chemical characteristics of ionic liquids, and subsequently reported the various applications in different subdisciplines of analytical chemistry, including the extraction procedure and separation techniques. Furthermore, in each paragraph the most recent applications of ionic liquids in the food, environmental, biological, etc. fields have been described.

Conclusion: Overall, the topic discussed highlights the key role of ionic liquids in analytical chemistry, giving hints for their future applications in chemistry but also in biology and medicine.

Keywords: GC; Ionic liquids; LC; analytical chemistry; extraction techniques; sample preparation

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