Fluorinated Ionic Liquids: Thermal and Thermophysical Properties

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Ionic liquids are salts entirely composed of ions, usually an organic cation and an organic or inorganic anion. The properties of these compounds can be manipulated by altering the nature and structure of the composing ions. Characteristics like hydrophobicity, biodegradation or toxicity can be taken into account when designing an ionic liquid to an industrial application. These unique properties of ionic liquids combined with the possibility of developing new and more efficient processes make them very attractive for industrial applications. The plethora of novel applications is expanding in areas such electrochemistry, physical chemistry, analytics, engineering and biomedical industry, among others [1]. Although the number of publications in ionic liquids had grown tremendously, there are still quite unexplored themes. That is the case of the fluorinated ionic liquids family. This specific family of ionic liquids is characterized by having fluorine tags longer than four carbons [2]. Fluorinated ionic liquids are a viable option, with improved properties, in areas where perfluorocarbons find relevant applications, such as imaging agents, fluorocarbon gels, nanocompartmented supramolecular architectures and colloids, control and stabilization of emulsions, microbubbles and other colloids, pulmonary delivery of drug and genes and oxygen therapeutics. The presence of three nanosegregated domains (polar, nonpolar and fluorinated) in this specific family of ionic liquids was already proved [3]. In this work, we show how the balance between these three domains influences the thermal and thermophysical properties, namely density, viscosity, iconicity, conductivity and melting and decomposition temperature, of these compounds.) The final aim of this study is to create knowledge that allows the design of fluorinated ionic liquid with desired properties for a specific application.

References

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