Surface Tension Measurements of Imidazolium Based Ionic Liquids

P.J. Carvalho, M.G. Freire,[S] A.J. Queimada, and I.M. Marrucho
CICECO, Chemistry Department, University of Aveiro, Aveiro, Portugal

J.A.P. Coutinho[C]
Departamento de Química, Campus Universitário de Santiago, Universidade de Aveiro, Aveiro, Portugal
jcoutinho@dq.ua.pt

Ionic liquids (ILs) are a novel class of chemical compounds with a large range of interesting characteristics that are driving a lot of research in various fields. Their stability, large liquid temperature range, and good solvation properties for both polar and nonpolar compounds make them interesting in many areas of technology and science.

Since ionic liquids are nonvolatile, they cannot contribute to atmospheric pollution. This property makes them attractive alternatives for organic solvents in several applications in the chemical industry, at a moment when pollution by volatile organic compounds is of great concern. Among the several applications foreseeable for ionic liquids in the chemical industry, there has been considerable interest in the potential of ILs for separation processes where, among others, ILs have shown to be promising in applications for the liquid-liquid extraction of organics from water, in electrochemistry, as solvents in organic synthesis, and as catalytic media.

Since many of the applications of ILs involve interfacial phenomena, obtaining information on their interfacial properties is extremely important in order to improve their selection and performance.

This study focuses on the surface tensions of imidazolium based ionic liquids, whereas the influences of different anions, the inclusion of alkyl groups on the cation, and the temperature dependence was studied earlier.

Surface tensions of pure ILs were measured in the temperature range between 288 and 343 K using the Du Noüy ring method with a NIMA DST 9005 tensiometer. The influence of the water content on the surface tension was also investigated, and different plots as a function of temperature and water content will be presented and discussed for the studied ILs.