Poster GC13

Dynamic TGA Study for [bpy][BF4] + [bpy][$Tf_2$2N] and [bpy][BF_4] + [4bmpy][Tf_2N] Ionic Liquids Mixtures

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Ionic liquids (ILs) are liquid salts at temperatures lower than 373 K or even at room temperature. ILs are promising new solvents in order to replace volatile organic compounds (VOCs), which are used now in industrial processes, mainly because of its negligible vapour pressure [1]. One of the most relevant fields in which ILs are being investigated is the liquid-liquid extraction of aromatics. In our recent studies, we have proposed the use of binary mixtures of ILs as solvents looking for improving individual results obtained for pure substances in both extractive and physical properties [2-5].

However, the thermal stability of a mixture of ILs has not been investigated yet, and because of this, the knowledge of the behaviour of a mixture of ILs under TGA analysis was the goal of this work. Dynamic TGA experiments were done for key compositions of the binary mixtures composed by butylpyridinium tetrafluoroborate ([bpy][BF_4]) and both 1-butyl-4-methylpyridinium bis(trifluoromethylsulfonyl)imide ([4bmpy][Tf 2 N]) and butylpyridinium bis(trifluoromethylsulfonyl)imide ([bpy][Tf_2N]). Both mixtures have shown high extractive properties in the liquid-liquid extraction of aromatics [2-3]. Dynamic TGA experiments were done at 5, 10, and 20 K·min^{-1} heating rates from 323.2 K to 1,173.2 K. Analysis were performed in a TGA851^e thermogravimetric analyser using N2 as reaction gas with a flow of 20 mL·min^{-1}.

Dynamic TGA results gathered in this work show that mixtures follow a completely proportional decomposition to pure ILs forming the mixture in the first steps of the loss of mass. At high temperatures, the behavior of mixtures is not fully ideal, possibly because of the interaction of decomposition products of both pure ILs. This intermediate behavior was also found in the analysis of extractive and physical properties for both mixtures measured here [2-5].

References

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