

Removing Ionic Liquids from Water Streams Using Aqueous Biphasic Systems

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Ionic liquids are a class of compounds that have interesting and unique properties. The huge number of applications of ionic liquids has increased in the past few years, both in academic and industry levels. However, in spite of the non-volatility of ionic liquids that leads to their classification as environmentally benign solvents, the production of ionic liquids in a large scale and their applications could guide to their dispersion into aquatic streams. Indeed, recent studies revealed that ionic liquids have different levels of toxicity and biodegradability; yet, their recuperation from waste water streams is a poorly studied field. Aqueous biphasic systems (ABS) are interesting approaches for the extraction, recovery and purification of biomolecules and/or drugs. In addition, these systems could be used as novel approaches to concentrate solutes that are soluble in aqueous media. Thus, the addition of salting-out inducing salts to aqueous solutions of ionic liquids could be used to remove ionic liquids from aqueous solutions. In this work distinct ABS were studied combining several ionic liquids and aluminium-based salts usually used for water treatment issues. Both phosphonium and imidazolium-based ionic liquids were investigated. The gathered results show a recovery of ionic liquids, for all the systems tested, above 96 %. The results obtained are very promising on the recovery and treatment of waste water streams contaminated with ionic liquids, thus making applications with ionic liquids more environmentally friendly.