

Sustainable Separation of Nicotine from Its Aqueous Solutions

Authors : Zoran Visak, Joana Lopes, Vesna Najdanovic-Visak

Abstract : Within this study, the separation of nicotine from its aqueous solutions, using inorganic salt sodium chloride or ionic liquid (molten salt) ECOENG212® as salting-out media, was carried out. Thus, liquid-liquid equilibria of the ternary solutions (nicotine+water+NaCl) and (nicotine+water+ECOENG212®) were determined at ambient pressure, 0.1 MPa, at three temperatures. The related phase diagrams were constructed in two manners: by adding the determined cloud-points and by the chemical analysis of phases in equilibrium (tie-line data). The latter were used to calculate two important separation parameters - partition coefficients of nicotine and separation factors. The impacts of the initial compositions of the mother solutions and of temperature on the liquid-liquid phase separation and partition coefficients were analyzed and discussed. The results obtained clearly showed that both investigated salts are good salting-out media for the efficient and sustainable separation of nicotine from its solutions with water. However, when compared, sodium chloride exhibited much better separation performance than the ionic liquid.

Keywords : nicotine, liquid-liquid separation, inorganic salt, ionic liquid

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