

Separation of Copper(II) and Iron(III) by Solvent Extraction and Membrane Processes with Ionic Liquids as Carriers

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Abstract : Separation of metal ions from aqueous solutions is important as well as difficult process in hydrometallurgical technology. This process is necessary for obtaining of clean metals. Solvent extraction and membrane processes are well known as separation methods. Recently, ionic liquids (ILs) are very often applied and studied as extractants and carriers of metal ions from aqueous solutions due to their good extractability properties for various metals. This work discusses a method to separate copper(II) and iron(III) from hydrochloric acid solutions by solvent extraction and transport across polymer inclusion membranes (PIM) with the selected ionic liquids as extractants/ion carriers. Cyphos IL 101 (trihexyl(tetradecyl)phosphonium chloride), Cyphos IL 104 (trihexyl(tetradecyl)phosphonium bis(2,4,4 trimethylpentyl)phosphinate), trioctylmethylammonium thiosalicylate [A336][TS] and trihexyl(tetradecyl)phosphonium thiosalicylate [PR4][TS] were used for the investigations. Effect of different parameters such as hydrochloric acid concentration in aqueous phase on iron(III) and copper(II) extraction has been investigated. Cellulose triacetate membranes with the selected ionic liquids as carriers have been prepared and applied for transport of iron(III) and copper(II) from hydrochloric acid solutions.

Keywords : copper, iron, ionic liquids, solvent extraction

Conference Title : ICCMME 2016 : International Conference on Chemical, Materials and Metallurgical Engineering

Conference Location : Barcelona, Spain

Conference Dates : December 12-13, 2016