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Membrane separation still continues to be one of the major challenges not only in chemical and biotechnological production processes, but also in waste water treatment. The goal of this work is to combine the recent developments in the field of membrane technology, e.g. supported liquid membranes [1,2], pervaporation [3,4], and gas separation [5,6] with the use of ionic liquids (ILs) for providing novel solutions in downstream processing or process intensification. ILs are currently explored as new reaction media for chemical synthesis or electrochemical applications, have emerged as a new class of solvents in the last decade. ILs seem to have a large potential in downstream processing (pervaporation or gas separation), especially when applied in a form that requires only a small amount of them, e.g. in supported liquid membranes. The special property of ILs is their non-measurable vapour pressure at ambient temperature that makes their application in liquid membranes attractive for pervaporation or gas separation. Pervaporation and gas separation is considered as a perspective and modern membrane process for the separation of various liquids or vapour mixtures. The major problem associated with solute recovery by membrane processes is the restrictive compromise between selectivity and flux: High solute selectivity involves the use of conditions that lead to relatively low mass fluxes in the membrane. Supported ionic liquid membranes offer a range of possible advantages: 1. Molecular permeation is much higher in liquids than in polymers, as liquids allow higher fluxes; 2. The selectivity of the separation can be influenced by variation of the liquid - especially ILs offer the advantage of a wide variety of properties; 3. Thanks to their special mixing behaviour ILs as liquid membranes easily allow three-phase systems; 4. Contrary to the extraction, only small amount of liquid is necessary to form the liquid membrane, thus allowing also the use of more expensive materials. Practical examples of utilization of ILs in downstream processes are given.

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