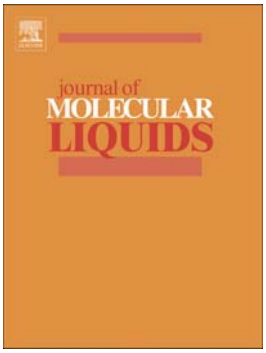

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Novel amine modification of ZIF-8 for improving simultaneous removal of cationic dyes from aqueous solutions using supported liquid membrane

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1. Abstract

Effect of amine modification of ZIF-8 on pertraction of mixed Rhodamine B (RhB) and Methylene blue (MB) cationic dye in aqueous solution was studied using flat sheet supported liquid membrane (SLM). Mixtures of mono-(2-etylhexyl) ester of phosphoric acid (M2EHPA), bis-(2-etylhexyl) ester of phosphoric acid (D2EHPA) and nanoparticles were used as carrier and Sesame oil as diluent. Microporous hydrophobic PTFE membrane was used as support for liquid membrane, and strip phase was acetic acid. It was found that loading of amine modified ZIF-8 nanoparticles in carrier, increases the dyes pertraction efficiency more than the pristine ZIF-8 nanoparticles and the optimum loading was obtained as 2000 mg L^{-1}.

Response surface methodology (RSM) based on Box-Benken design (BBD) with optimum amine modified ZIF-8 nanoparticles loading was used to design the experiments and analyze the effects of three major operating parameters including feed concentration, carrier concentration and initial feed phase pH. The optimum pertraction efficiency for MB and RhB were found as 88.3 and 99.1% respectively and obtained after 10 h in feed concentration of 100 mg L^{-1}, carrier concentration of 35 vol. % and initial feed phase pH of 6.

Keywords: Supported liquid membrane, Dye mixture, D2EHPA/M2EHPA, Amine modified ZIF-8 nanoparticles.