



Cyclohexane/cyclohexene separation by extractive distillation with cyano-based ionic liquids



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ABSTRACT

Cyclohexane/cyclohexene separation is one of the most complex and relevant hydrocarbon separations due to the close boiling points of these two cyclic hydrocarbons and the relevance of both compounds in the petrochemical industry. The production of cyclohexane, cyclohexene, and benzene usually means the existence of cyclohexane/cyclohexene mixtures and the necessity of their separation. A current approach in search of new processes for this challenging separation is the development of liquid-liquid extraction technology using ionic liquids. Nevertheless, systematic limitations observed for the extensive collection of ionic liquids proved so far have boosted to further investigate the extractive distillation with ionic liquids as a better separation technology. Five selected cyano-based ionic liquids were tested in the cyclohexane/cyclohexene separation. Vapor-liquid equilibria (VLE) data were determined by a combined headspace-gas chromatography technique (HS-GC) and fitted to the non-random two liquids (NRTL) model. From the obtained results, the cyclohexane/cyclohexene relative volatility with the studied ionic liquids is enhanced in comparison with that provided by conventional solvents. Then, extractive distillation with cyano-based ionic liquids stands as a suitable way to perform the cyclohexane/cyclohexene separation.

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