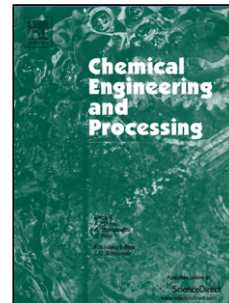


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Vapor-liquid equilibrium and distillation of mixtures containing formaldehyde and poly(oxymethylene) dimethyl ethers

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Abstract

Poly(oxymethylene) dimethyl ethers (OME, $\text{H}_3\text{C}-\text{O}-(\text{CH}_2\text{O})_n-\text{CH}_3$) are promising synthetic diesel fuels. For designing OME production processes, a model for describing the vapor-liquid equilibrium (VLE) in mixtures of (formaldehyde + water + methanol + methylal + OME + trioxane) is needed. Building on previous work of our group, a physico-chemical model for the VLE in these mixtures is developed in the present work. For the development and the testing of the model, experiments of different types were carried out: VLE measurements in a thin film evaporator, batch evaporation experiments in an open still, and continuous distillation experiments in a laboratory column. The model predicts the results of the distillation experiments well. It is shown that OME with $n \geq 3$ can be separated as bottom product from mixtures of formaldehyde, water, methanol, methylal,

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