Irreversible Model for Representing the Dynamic Behaviour of Simple Distillation Processes

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Abstract
The available computational tools for distillation column simulations are generally based on equilibrium models. However, the equilibrium between the liquid and the vapour phases hardly ever occurs in real processes. This work is concerned with the computational aspects of the dynamic behaviour of a simple distillation process using the irreversible model. The composition trajectories in residue curve map diagrams were calculated for the methanol/isopropanol/water mixture. The composition paths calculated by the irreversible model were compared with published experimental results for this mixture. The simulation results show that residue curves, including the distillation boundaries, are sensitive to the model applied. Furthermore, since distillation boundaries and residue curves were constructed with the same model (equilibrium or irreversible one), it can be concluded that residue curves are really forbidden to cross a distillation boundary. Another phenomenon observed from the numerical results is the occurrence of dynamic binary azeotropes in the nonideal mixture analysed.

Keywords: distillation process, dynamic process, irreversible model, residue curves

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