

Rate-based Distillation - Examples and Property Needs

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Rate-based distillation is increasingly used in chemical process analysis and design because the advanced software is now accessible to practicing engineers [1]. However, experience with the use of this advanced tool is limited, and additional property information (e.g., viscosities, diffusion coefficients and reaction kinetics) now become important in addition to the phase equilibrium and enthalpies used in the past.

This paper highlights the valuable new information and predictive capability that results from rate-based distillation calculations; vague approximations like component efficiencies and HETP (height of an effective theoretical plate) can be eliminated. The examples cover physical absorption, where mass-transfer rates are important, and reactive distillation for which reaction kinetics are needed in addition to the mass-transfer rates.

The paper also analyzes the availability of the additional property data and correlations required for rate-based distillation and identify areas where new developments are needed.

- [1] R. Taylor, R. Krishna, H. Kooijman, "Real-World Modeling of Distillation," *Chemical Engineering Progress*, July 2003, p. 28.