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Dynamics of Reactive Distillation Processes with Potential Liquid Phase Splitting

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The reactive distillation (RD) process integrates chemical reaction and separation by distillation in a single processing unit. This structural approach has a big economical advantage over the conventional process designs (Rădulescu at al. 2013, 2014).

However, one important disadvantage must be revealed: due to the strong interaction between reaction and separation, RD processes can sometimes show an intricate nonlinear dynamic behavior. Naturally, a profound understanding and reliable prediction of these phenomena is not only of scientific interest, but also a necessary prerequisite for improved process design and industrial control (Gangadwala et al., 2004; Rădulescu at al. 2013, 2014).

RD processes with a single liquid phase can be easily simulated in steady state as well as in dynamic mode. However, no standard simulation tools are available for the dynamic simulation of these processes with potential phase splitting. After many years of experiments in the field, this contribution proposes a dynamic reactive distillation column model taking into account the potential liquid phase splitting, very useful in practical studies on the nonlinear process dynamic behavior (Rădulescu at al. 2013, 2014).

References

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