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Reactive Dividing Wall Column for Hydrolysis of Methyl Acetate: Design and Control[#]

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Abstract

Reactive distillation and dividing wall column distillation are two kinds of effective separation technologies, and their integrated configuration, reactive dividing wall column (RDWC), presents attractive advantages. In this study, the rigorous simulation of RDWC for methyl acetate hydrolysis is performed, and sensitivity analysis is conducted to obtain the minimum reboiler duty. Then a comparison is made between the conventional process and RDWC process, and it shows 20.1% energy savings can be achieved by RDWC process. In addition, the dynamic characteristic of RDWC is studied and an effective control strategy is proposed. The simple PI control scheme with three temperature loops can obtain reasonable control performance and maintain products at desired purities. It is proved that this RDWC process is an energy efficiency alternative with good controllability.

Keywords: Reactive dividing wall column; Methyl acetate; Hydrolysis; Design; Control

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