

### Heat-Integrated Optimization of Reactive Distillation Configuration for the Formic Acid Production

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The heat-integrated optimization of reactive distillation (RD) configuration for the 85wt% formic acid production was investigated successfully in this work. The base case design of this process referred to Huang's process. A better process design with the minimum total energy requirement was obtained by optimization method. The obtained optimum structure was then used as reference to the other configurations in order to reduce the occurrence of the "remixing effect" phenomenon. The thermally coupled configuration, the external heat-integrated configuration and the double effect thermally coupled configuration were several advanced configurations which were proposed to handle this phenomenon. As results, the remixing effect can be reduced and the total energy consumption can be obtained less than the base case design. In addition, the results showed that the double effect thermally coupled configuration was the best alternative in term of energy performance for this work.

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