HEAT-INTEGRATED DESIGN OF FORMIC ACID PRODUCTION VIA REACTIVE DISTILLATION CONFIGURATION

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ABSTRACT

The heat-integrated design of formic acid production via reactive distillation (RD) configuration will be investigated in this thesis. The design for this process refers to Huang’s process and it is optimized to obtain a better process design that has the minimum total energy. Later on, design which is optimized will be used as reference by the other configuration to reduce the “remixing effects” phenomena which may occur. The first approach is the thermally coupled configuration. As the results, the “remixing effects” can be reduced and minimum total energy less than the base case and optimization design can also be achieved. This research also investigates another heat-integrated method. It is external heat integration which uses the heat of top distillate vapor in one column to transfer the heat to side heater and/or to the reboiler of another column. The results for this method are better than the thermally coupled one because the total energy can be further reduced compared to thermally coupled design.

Keywords: heat-integrated, formic acid production, reactive distillation, thermally coupled, external heat integration.
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