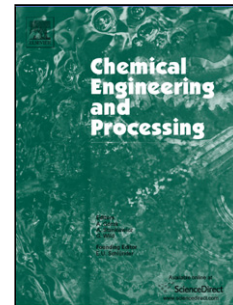


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Control Analysis of an Extractive Dividing-Wall Column used for Ethanol Dehydration

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Abstract

This paper deals with design and control of an extractive dividing-wall distillation column (EDWC) for ethanol dehydration using ethylene glycol as entrainer. An initial design, based on a section analogy procedure for a conventional extractive distillation sequence, was obtained and then used in an optimization process to minimize the total annual cost. It was shown that the EDWC can result in significant savings over the conventional process. As these savings sometimes go along with a decrease in the control properties, an investigation of two control structures for the EDWC and one for the conventional column configuration was performed next. It was observed in closed-loop simulations that the EDWC with an appropriate structure exhibited good control properties and that its closed-loop responses were similar to those obtained for the operation of a conventional extractive distillation system.

Keywords: Bioethanol, Ethanol, Thermally coupled column, Dividing-wall column, Extractive distillation.

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