Methodology for Design and Analysis of Reactive Distillation Involving Multielement Systems - DTU Orbit (14/12/2018)

Methodology for Design and Analysis of Reactive Distillation Involving Multielement Systems

A new methodology for design and analysis of reactive distillation has been developed. In this work, the element-based approach, coupled with a driving force diagram, has been extended and applied to the design of a reactive distillation column involving multielement (multicomponent) systems. The transformation of ordinary systems to element-based ones and the aggregation of non-key elements allow the important design parameters, such as the number of stages, feed stage and minimum reflux ratio, to be determined by using simple diagrams similar to those regularly employed for non-reactive systems consisting of two components. Based on this methodology, an optimal design configuration is identified using the equivalent binary-element-driving force diagram. Two case studies of methyl acetate (MeOAc) synthesis and methyl-tert-butyl ether (MTBE) synthesis have been considered to demonstrate the successful applications of the methodology. Moreover, energy requirements for various column configurations corresponding to different feed locatio

General information
State: Published
Organisations: Computer Aided Process Engineering Center, Department of Chemical and Biochemical Engineering, Technical University of Dortmund, Chulalongkorn University
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Pages: 1295-1307
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Chemical Engineering Research & Design
Volume: 89
Issue number: 8
ISSN (Print): 0263-8762
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 3.08 SJR 0.847 SNIP 1.381
Web of Science (2017): Impact factor 2.795
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.79 SJR 0.821 SNIP 1.348
Web of Science (2016): Impact factor 2.538
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 2.7 SJR 0.852 SNIP 1.434
Web of Science (2015): Impact factor 2.525
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.91 SJR 1.022 SNIP 1.671
Web of Science (2014): Impact factor 2.348
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.56 SJR 0.953 SNIP 1.673
Web of Science (2013): Impact factor 2.281
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.31 SJR 0.918 SNIP 1.611
Web of Science (2012): Impact factor 1.927
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 2.12 SJR 0.903 SNIP 1.327
Web of Science (2011): Impact factor 1.968