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RESEARCH PAPERS

Thermodynamic Analysis, Simulation and Optimization on Energy Savings of Ideal Internal Thermally Coupled Distillation Columns

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摘要 Internal thermally coupled distillation columns (ITCDIC) are the frontier ofdistillation energy saving research. In this paper, a novel energy savingmodel of ideal ITCDIC anda simulation algorithm are presented, upon which a series of comparativestudies on energy savingswith conventional distillation columns are carried out. Furthermore, wepresent an optimizationmodel of ideal ITCDIC, which can be used to achieve the maximum energysaving and find theoptimal design parameters directly. The binary system of benzene-tolueneis adopted for theillustrative example of simulation and optimization. The results showthat the maximum energysaving of ITCDIC is 52.25% (compared with energy consumption ofconventional distillation underthe minimum reflux ratio operation); the optimal design parametersare obtained, where therectifying section pressure and the feed thermal condition arepr= 0.3006 MPa and q=0.5107 respectively.

关键词 distillation thermal coupling energy savings simulation, optimization

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Key words distillation; thermal coupling; energy savings; simulation optimization

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