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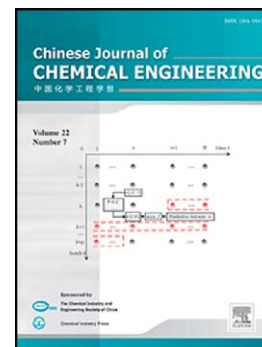
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A Novel Method Based on Entransy Theory for Setting Energy Targets of Heat Exchanger Network*

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Abstract: A T-Q diagram based on entransy theory is applied to graphically and quantitatively describe the irreversibility of the heat transfer processes. The hot and cold composite curves can be obtained in the T-Q diagram. The entransy recovery and entransy dissipation that are affected by temperature differences can be obtained through the shaded area under the composite curves. The method for setting the energy target of the HENs in T-Q diagram based on entransy theory is proposed. A case study of the diesel oil hydrogenation unit is used to illustrate the application of the method. The results show that three different heat transfer temperature differences is 10 K, 15 K and 20 K, and the entransy recovery is 5.498×10^7 kW·K, 5.377×10^7 kW·K, 5.257×10^7 kW·K, respectively. And the entransy transfer efficiency is 92.29 %, 91.63 %, 90.99 %. Thus, the energy-saving potential of the HENs is obtained by setting the energy target based on the entransy transfer efficiency.

Key words: heat transfer; process systems; entransy; energy target; T-Q diagram

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