

传递现象

## 基于温差函数的低温多效蒸发海水淡化过程热力学分析

丁涛, 王世昌

天津大学化工学院, 化学工程联合国家重点实验室

收稿日期 2007-11-20 修回日期 2008-2-18 网络版发布日期 2008-5-9 接受日期

摘要

从分析低温多效蒸发海水淡化过程的不可逆性出发, 建立了海水加热和蒸发以及冷凝器海水预热过程的火用损失关系; 导出了反映低温多效蒸发过程热力学效率的不可逆温差函数, 为分析、评价过程的热力学效率提供了新的工具; 并在温差函数的基础上研究讨论了蒸发器总效数、冷凝器端差、首效加热蒸汽温度和相对热容率等关键因素对低温多效蒸发海水淡化过程热力学效率的影响, 为过程的优化、提高过程的能量利用率指明了方向。

关键词

[低温多效蒸发](#) [海水淡化](#) [热力学分析](#) [温差函数](#)

分类号

## Thermodynamic analysis of LT-MED desalination process based on temperature difference function

DING Tao, WANG Shichang

### Abstract

The temperature difference function (TDF) reflecting the thermodynamic efficiency in the low-temperature multi-effect distillation (LT-MED) processes was developed, which provided a convenient tool to analyze the irreversible behavior and evaluate the thermodynamic efficiency of this system. Based on TDF, the effects of several key factors, including the total number of effects of evaporator, the terminal temperature difference of condenser, the heating steam temperature in the first effect and the ratio of thermal capacities, on the thermodynamic efficiency of LT-MED were investigated. The results showed that the exergy loss increased with increasing terminal temperature difference of condenser, increasing heating steam temperature in the first effect and increasing ratio of thermal capacities, but decreased with increasing the total number of effects of evaporator.

### Key words

[LT-MED](#) [desalination](#) [thermodynamic analysis](#) [temperature difference function](#)

DOI:

通讯作者 王世昌 [jiswang@tju.edu.cn](mailto:jiswang@tju.edu.cn)

### 扩展功能

本文信息

▶ [Supporting info](#)

▶ [PDF\(827KB\)](#)

▶ [\[HTML全文\]\(0KB\)](#)

▶ [参考文献](#)

服务与反馈

▶ [把本文推荐给朋友](#)

▶ [加入我的书架](#)

▶ [加入引用管理器](#)

▶ [复制索引](#)

▶ [Email Alert](#)

▶ [文章反馈](#)

▶ [浏览反馈信息](#)

相关信息

▶ [本刊中 包含“](#)

[低温多效蒸发” 的相关文章](#)

▶ [本文作者相关文章](#)

· [丁涛](#)

· [王世昌](#)