عنوان مقاله:

Multi objective optimization of the MED-TVC system with exergetic and heat transfer analysis

محل انتشار:

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خلاصه مقاله:

The mathematical model to predict the performance and the exergetic efficiency in a multi-effect desalination system with thermal vapor compression (MED-TVC system) has been presented. The energy and the concentration conservation law were developed for each effect, considering the boiling point elevation and the various thermodynamic losses by developing the mathematical models. These analyses led to the determination of the thermodynamic properties at different points and to the gain output ratio (GOR) values. Then, a heat transfer equation was developed in each effect and the required heat transfer areas were determined. Finally, irreversibility analysis was performed, from which the exergy destruction (considering chemical and physical exergy) and the exergetic efficiency were calculated. To obtain the optimum point of a system, multi-objective optimization was used. Determination of the best trade-off between GOR and heat transfer area was the final goal of this optimization. The .optimum design led to a selected system with the lowest heat transfer area (and related cost) and the highest GOR

کلمات کلیدی:

Desalination, Exergy Analysis, Heat Transfer Analysis, Multi-Effect Distillation, Optimization