Thermodynamic optimization of an absorption heat transformer

Optimisation thermodynamique d'un transformateur de chaleur à absorption

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Abstract

In this paper questions relating to the performance optimization of heat driven pump systems are discussed. For this purpose a mathematical model for LiBr/H_2O absorption heat transformer (AHT) operating according to the endo-irreversible cycle is elaborated. The model is exploited to find out the optimal operating parameters using the so called structural analysis. It shows the influence of some operating parameters on the local irreversibility rates with respect to the overall AHT irreversibility rate. At the end of this work a comparison is performed of the COP, first and second law efficiencies obtained for the optimal operating regime to those calculated for real operating conditions for an already existing AHT. It is concluded that for the same thermal powers and heat transfer parameters, an increase is performed of the first and second law efficiencies equal to 10% and 5.3% consecutively at the obtained optimal operating regime.

Keywords

- Absorption;
- Exergy;
- Heat transformer;
- Irreversibility;
- Low temperature;
- Optimization