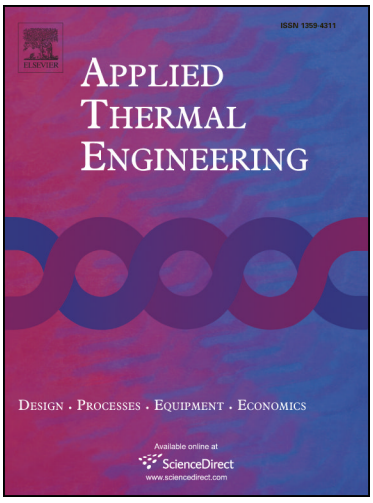

Ammonia lithium nitrate and ammonia sodium thiocyanate double effect absorption refrigeration systems: Thermodynamic analysis

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Ammonia lithium nitrate and ammonia sodium thiocyanate double effect absorption refrigeration systems: Thermodynamic analysis

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Abstract:

This paper presents a comparison of the performance for three configurations of double effect absorption refrigeration systems with single effect one using ammonia lithium nitrate ($NH_3/LiNO_3$) and ammonia sodium thiocyanate (NH_3/NaSCN) as working solutions. The effect of operating parameters on COP and exergetic efficiency of the cycles is investigated. In order to avoid error in estimation of solutions enthalpy and entropy at high temperatures, linear equations for specific heat of solutions are obtained from correlating the experimental data. Furthermore, the effects of operating parameters on crystallization possibility are studied. The COP of double effect systems are maximum 60% more, but exergetic efficiency is maximum 16% less than those for single effect cycles. The $NH_3/LiNO_3$ systems compared to the NH_3/NaSCN systems can perform at lower generator temperatures with higher COP and exergetic efficiency. Operating range of $NH_3/LiNO_3$ system is wider, since it is limited for NH_3/NaSCN cycle because of crystallization occurrence.

Keywords: Double effect absorption refrigeration; Ammonia lithium nitrate; Ammonia sodium thiocyanate; Thermodynamic analysis; Crystallization.

Nomenclature

COP	coefficient of performance
c_p	specific heat at constant pressure, kJ kg^{-1} K^{-1}
D	distribution ratio