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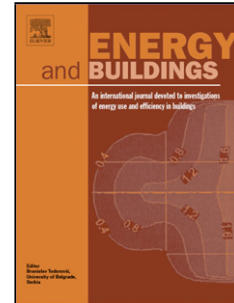
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Performance characterization of membrane dehumidifier with desiccants in flat-plate arrangement

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Highlights of Research

- Steady state heat and mass transfer of the membrane dehumidifier is modeled.
- Effect of operating parameters and different types of desiccant are investigated.
- Air flow rate has the highest impact on the dehumidifier performance.
- LiCl has the highest moisture removal rate than LiBr and CaCl₂ desiccants.
- Control of air dehumidification for fluctuating ambient conditions is studied.

Abstract

The liquid desiccant system is one of the energy efficient alternatives to the conventional air conditioning systems for addressing the impact of latent load. Membrane-based liquid desiccant system is used to avoid desiccant carryover with the process air, which is commonly encountered in direct contact desiccant systems. The performance of such a desiccant system depends on the type of membrane used as well as the nature of desiccant. In the present study, a numerical model is developed to investigate the effect of operating parameters in the membrane-based dehumidifier using different desiccants, such as LiCl, LiBr and CaCl₂, for hot and humid climatic conditions prevailing in Chennai. The operating parameters of air side include inlet specific humidity, temperature and mass flow rate while those of desiccant side are inlet concentration, temperature and mass flow rate. Performance of the three desiccants has been compared by analysing moisture removal rate as well as

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