

Abstract

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Experimental and Theoretical Investigation of Packed Column Absorber in Absorption System

Absorption refrigeration technology presents a promising alternative for vapor compression cooling system due to the increase of the environmental problems and electricity cost which made this heat-operated cycle more attractive for both residential and industrial applications. In order to assess the viability of these systems economically, the user needs to assess the effect of some operational parameters on system's performance. The first objective of this study is to develop a friendly usable thermodynamic model to analyze the performance of the vapor absorption system through studying the effect of parameters like condenser's temperature, generator's temperature and absorber's temperature on the Coefficient of performance of the system. The model solves the governing equations for the system's components and incorporates the chemical and thermodynamic properties of the water/lithium bromide solution. The second objective of this study is to design and manufacture a packed column absorber model to study the effect of various packing on the absorption rate in order. The study is also used to investigate the effect of many parameters on the average absorption rate which presents the performance of the apparatus. These parameters are type, height and the porosity of the packing. The results show that the absorber temperature and its rate of heat transfer has a significant effect on the COP of the system. As a result of experimental work, it was found that the use of packed column absorber increases the average absorption rate in the absorption system significantly.