THESIS INFORMATION

Title: **STUDYING THE HEAT AND MASS TRANSFERS IN THE ABSORBER OF THE CONTINUOUS NH_3-H_2O ABSORPTION REFRIGERATION MACHINE APPROPRIATE TO THE CONDITIONS OF VIETNAM**

Major: **Thermal Engineering**

Major code**:** **62520115**

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University: **University of Technology, Vietnam National University – Ho Chi Minh City**

Scientific significance:

- The study on the heat and mass transfers in the absorber of the continuous NH_3-H_2O absorption refrigeration machine is presented in this thesis. In this study, one of the main requirements is that the selected absorber structure must be suited the available fabrication condition in the country.

- In order to carry out the above mentioned items, a complete continuous NH_3-H_2O absorption refrigeration machine was fabricated and tested. For the purpose of establishing stable and controlled operation to meet the research requirements, the machine was heated by using electricity. Many experiments were carried out, the results were evaluated/compared with the results from the simulation programs. In addition, empirical studies were done to determine the suitable operating modes for the entire system appropriate to the environmental conditions in Vietnam. The contents of this thesis satisfy the requirement for the degree of Doctor of Philosophy.

Contributions of this thesis:

- A simulation program of the continuous NH_3-H_2O absorption refrigeration machine was accomplished. The comparison studies were done and they confirmed that the simulation results are in accordance with the experimental data.
- A single effect NH_3-H_2O absorption refrigeration machine producing ice was fabricated in current in-country technology conditions.
- The intake concentration of NH_3-H_2O solution corresponding to the saturation temperature of the refrigerant in the evaporator, the saturation temperature of the refrigerant in the condenser and the temperature of the strong solution leaving the absorber was determined. Based on this result, the COP of the absorption refrigeration machine can reach the reasonable value corresponding to the case studied.
- The relationship between the optimal generation temperature according to the saturation temperature of the refrigerant in the evaporator, the saturation temperature of the refrigerant in the condenser and the temperature of the strong solution leaving the absorber was established.
- The influences of the solution mass flow rate per unit tube length, the cooling water temperature and the weak solution concentration on the heat and mass transfer coefficients in the absorber were determined.
- The relationships of the heat transfer and the mass transfer coefficients of the absorption process to: (i) the solution concentration ranging from 28% to 31%, (ii) solution mass flow rate per unit tube length ranging from 0,001*[kg/(m.s)]* to 0,03*[kg/(m.s)]* and (iii) the cooling water temperature ranging from 301*K* to 311*K* were established.

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