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Evaluation of Minimum, Maximum and Optimum Source Temperature for Solar-Powered Adsorption Refrigeration System

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Abstract

Due to the utilization of solar thermal energy and environmentally friendly nature, globally there is a huge thrust toward the development of vapor adsorption refrigeration systems. Indeed, it is necessary to identify the minimum, maximum and optimum temperatures of heat source for solar-powered adsorption systems. With this objective, the presented paper focuses on the evaluation of lower, upper and optimum temperatures of the heat source to run the adsorption refrigeration system. Performance parameters, cooling capacity and coefficient of performance (COP), have been utilized to derive the limits of source (desorption) temperatures and applied to two different adsorbent–adsorbate pairs, namely Maxsorb III–ethanol and Maxsorb III– R134a. The adsorption and evaporator temperatures considered for the analysis are 25–40 °C and – 10–10 °C, respectively.

Keywords:

Adsorption refrigeration system, Cooling capacity, COP, Desorption temperature

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