Genetic Optimization of the Performance of the Solar Adsorption Refrigeration System for Iraq Climate

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Abstract

An optimization of the performance of the Solar Adsorption Refrigeration System unit with Genetic Algorithms (GA) is performed. A good design of the generator leads to smooth operation and better results, so more attention must be paid towards the design influence on the performance of the system, with respect to many factors that have an effect on the performance of adsorptive solar ice maker unit. These factors contain Geometrical factors, Concentration factor Operating factors and Climatic factors. Which play an essential role on the designed, constructed, tests and optimized the solar adsorption refrigeration system in order to confirm and achieve the possibility of the principles of solar adsorption refrigeration system and assess the amount of methanol percentage to the amount of activated carbon (A.C). This research is a part of PhD thesis. A field solar powered of ice maker unit designed, analyzed, built and tested, this unit was tested during three months from May till August 2012. The maximum (COP) of the solar adsorption system was 0.49 by ordinary calculation and 0.4883 by Genetic Optimization so there is compatible agreement between the classical method and Genetic Optimization. The concentration ratio X0 kg Methanol/kg (A.C) of the present solar adsorption system was 0.29 as
a result of the experimental work and 0.286 by genetic optimization. The maximum mass desorbed is approximately 600 g / 3 kg (A.C) which is a good quality for forming 1 kg of ice, when the average solar radiation in Iraq was 900 W/m².

References


Index Terms

Computer Science

Information Sciences

Keywords

Optimization; Refrigeration; Genetic; Solar energy ; activated carbon