Efficiency Evaluation of a Based Clinoptilolite Zeolite-Brine Natural Refrigerants in Refrigeration Systems

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Energy consumption and refrigerants employed in air conditioning are an environmental concern due to global warming and ozone layer destruction. However, this problem can be minimized by the substitution of environmentally friendly natural refrigerants. Zeolite and brine are two natural products widely used as natural refrigerants. The objective of this research is to evaluate the efficiency of a Clinoptilolite zeolite-brine solution as a natural refrigerant. Until now, both refrigerants have been used independently with optimal heat absorption characteristics without high risks. Here, we use control and experimental variables to measure the change in temperature every 10 seconds periods, to assess the potential of Clinoptilolite zeolite and brine refrigerants independently and as a mixed solution. The results indicate that brine and Clinoptilolite zeolite, when used independently, could reach a temperature of 273 Kelvin degrees. However, we found an optimal concentration of 70% brine and 30% zeolite (70:30) by weight percentage in a liquid state, to drop temperature close to 271 Kelvin degrees in average. This demonstrates that a brine-clinoptilolite zeolite based solution can be used as a natural refrigerant with a capacity to absorb heat at a lower temperature and keep its fluency in a liquid state. Keywords – energy consumption, natural refrigerant, brine, zeolite, refrigeration systems, fluency.

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