



EXPERIMENTAL INVESTIGATION OF SOLID SORPTION COOLER WITH IMPROVED LOW TEMPERATURE SORBER BY MICRO HEAT PIPE EFFECT

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ABSTRACT

Sorption cooler using renewable power sources (solar energy) was created and experimentally investigated. Sorption cooler consists of two high temperature adsorbers with complex sorbent (activated carbon fiber with microcrystals of MnCl_2) and heat pipe thermal control and the third low temperature sorber (activated carbon fiber with BaCl_2). Ammonia was chosen as a working fluid. The cooler thermal management is based on heat pipes. The sink of the cold is the air flow. The system can work as a resorption cooler without any liquid in a cycle or can have both sorption and condensation in low temperature sorber. Presence of liquid in porous structure causes the effect of micro heat pipes during the process of evaporation increasing effective thermal conductivity in the sorbent bed of the system. Also combination of adsorption/condensation and evaporation/desorption increases the amount of heat and cold generation in adsorber and cold production time.

Keywords: solid sorption, heat pipe heat management, complex sorbent, renewable power sources, micro heat pipe effect.