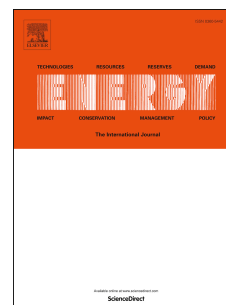


# Accepted Manuscript

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Selection criteria for effective sorbent-glue pair

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PII: S0360-5442(18)30468-7

DOI: [10.1016/j.energy.2018.03.060](https://doi.org/10.1016/j.energy.2018.03.060)

Reference: EGY 12518

To appear in: *Energy*

Received Date: 14 November 2017

Revised Date: 22 February 2018

Accepted Date: 10 March 2018

Please cite this article as: Grabowska K, Krzywański Jarosław, Nowak W, Wesołowska M, Construction of an innovative adsorbent bed configuration in the adsorption chiller - Selection criteria for effective sorbent-glue pair, *Energy* (2018), doi: 10.1016/j.energy.2018.03.060.

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# CONSTRUCTION OF AN INNOVATIVE ADSORBENT BED CONFIGURATION IN THE ADSORPTION CHILLER - SELECTION CRITERIA FOR EFFECTIVE SORBENT-GLUE PAIR

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**Keywords:** adsorption chillers, coefficient of performance, low-grade thermal energy, coated adsorption beds, adsorbents

**Abstract:** Due to the progressive climate changes, increasing demand for cooling is observed. Therefore, ecological alternatives to conventional cooling systems based on electricity are analysed. One of the promising solutions are adsorption chillers which can be powered by low grade thermal energy sources such as waste heat, solar power and heat produced in cogeneration. However, contemporary adsorption chillers achieve lower COP (coefficient of performance) when compared to conventional electricity-driven compression refrigerators. Refrigeration capacity of the adsorption chiller is obtained with the use of thermal effects which occur during adsorption and desorption processes on porous media and the intensification of this phenomena is currently one of the most important research challenges. The paper presents development of guidelines to build novel coated construction of adsorption beds. The criterion for selection of optimum bed components in terms of improving COP of the adsorption chillers dedicated to air conditioning has been defined. Silica gel has been indicated as the most favorable sorbent for modification of the bed construction with glue.

## Nomenclature

*COP* – coefficient of performance;

$Q_p$  – heat from the evaporation process, J

$Q_h$  – heat supplied in the desorption process, J

$Q_d$  – heat supplied in the bed heating process, J

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