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Materials for Thermal Energy Conversion and Storage

## Novel Materials for Adsorptive Heat Pumping and Storage: Screening and Nanotailoring of Sorption Properties

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The brief review of innovative materials for adsorptive pumping and storage of low temperature heat as well as current trends in this field showed their great potential. To implement it in the near future it is reasonable to follow two complementary lines: (a) systematic testing for this application novel adsorbents initially developed for other targets (gas drying, separation, etc.), and (b) tailoring of new specific porous materials adapted just to variety of adsorptive cooling, heating and storage cycles under different climatic and boundary conditions. The main idea of the latter approach is that for each particular adsorptive cycle there is an optimal adsorbent, the thermodynamic characteristics of which could allow perfect performance of this cycle. The first step of the analysis is the formulation of requirements to this desirable (ideal) adsorbent. Then, the final step is to design and synthesize a new adsorbent with sorption properties close or even equal to those determined before as perfectly fitting the cycle. Particular examples of nanotailoring of adsorption properties are given for two phase materials, composites “a salt in a porous host matrix”, which can be used as efficient adsorbents of water, methanol and ammonia.

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