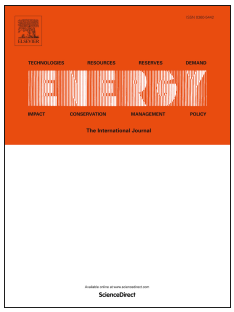
Accepted Manuscript



Universal scalable sorption-based atmosphere water harvesting

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PII: S0360-5442(18)31870-X

DOI: 10.1016/j.energy.2018.09.106

Reference: EGY 13800

To appear in: *Energy*

Received Date: 13 August 2018

Revised Date: 9 September 2018

Accepted Date: 15 September 2018

Please cite this article as: Wang JY, Wang RZ, Tu YD, Wang LW, Universal scalable sorption-based atmosphere water harvesting, *Energy* (2018), doi: https://doi.org/10.1016/j.energy.2018.09.106.

Universal scalable sorption-based atmosphere water harvesting

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ABSTRACT

Air water harvesting (AWH) is a prospective way to make people live in extreme conditions, such as arid desert and remote islands. However, the refrigeration-based AWH suffers from ineffectiveness at low humidity, while the current sorption-based solar driven AWH has low area specific water production. To provide affordable water, it is essential to design universal and scalable systems to effectively capture moisture from air year-round with less energy consumption at different locations. Here we develop a theoretical framework and demonstrate a scalable prototype on the sorption-based AWH. The prototype adopts a temperature-insensitive and *RH*-broadband desiccant, achieving a large water harvesting capacity in different regions. Scalable modular sorbers with sinusoidal honeycomb structure are used. The prototype harvests ca. 38.5 kg fresh water per day, consuming ca.7.2 MJ heat / kg fresh water. The performance analyses show that our device can harvest freshwater universally, which is a promising solution to relieve the thirsty world.