

# 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](https://doi.org/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>.

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## 1           **Universal scalable sorption-based atmosphere water harvesting**

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### 7   **ABSTRACT**

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

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