

# Solar outdoor courtyard dew device

How does a solar-driven water harvesting system work?

Attributed to effective heat confinement on the sorption bed and rapid heat rejection on the condenser, the MWH can extract over 46% of the sorbent's adsorbed water when the average solar irradiation is as low as 300 W m<sup>-2</sup>. This ability to perform water harvesting under weak sunlight is unique among existing solar-driven SAWH systems.

Can dual-stage solar-thermal AWH improve water productivity and scalability?

New strategies are needed to improve the productivity and scalability of solar-thermal AWH. Here, we introduce a dual-stage AWH device (Figure 1A) as a strategy to improve the water productivity (LMD) (L/m<sup>2</sup>/day, defined as liters of water produced per solar absorbing area per day) of single daily cycle devices.

Does adsorption-based solar-thermal-driven atmospheric water harvesting work in arid regions?

Recent work has demonstrated adsorption-based solar-thermal-driven atmospheric water harvesting (AWH) in arid regions, but the daily water productivity (L/m<sup>2</sup>/day) of devices remains low. We developed and tested a dual-stage AWH device with optimized transport.

What materials can be used for a dual-stage solar absorber?

For example, thinner copper-condenser surfaces and aluminum foam (which is ~1/3 the density of nickel) can be used for the solar absorbers in a dual-stage atmospheric water harvesting device. However, the larger sensible energy requirement per solar absorber area should be considered when evaluating the application of the dual-stage device.

Can hipg-based solar-wind coupling-driven continuous Sawh provide a sustainable water supply?

This work demonstrated a HIPG-based solar-wind coupling driven continuous SAWH device with high thermal efficiency and high water productivity, providing a promising pathway to realize highly efficient and sustainable clean water supply for off-grid and arid regions.

How to measure water desorption performance of hipg under different solar intensities?

To measure the water desorption performances of HIPG under various solar intensities, bulk HIPG samples saturated at 25 °C and 60% RH were placed in the constant climate chamber to release water vapor under 25 °C, 60% RH and 1-4 sun irradiation intensities, respectively. The analytical balance was employed to record the mass changes of the samples.

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This sorption bed enables the solar absorber to be exposed to the sunlight first and then guides the desorbed moisture to transport it upward in the central air channel. In this case, the MWH's solar absorption is decoupled with water desorption, thus improving solar absorption and speeding up water release. Meanwhile, the inclined ...

In outdoor experiments, we demonstrated a dual-stage water harvesting device using commercial zeolite (AQSOA Z01) and regeneration under natural, unconcentrated sunlight where  $\sim 0.77$  L/m<sup>2</sup> /day of water was harvested.

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In this study, we present a stand-alone SAWE system capable of producing freshwater without requiring maintenance, solely using sunlight. Under 1-sun illumination, the system produces 0.65 L m<sup>-2</sup> h...

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Solar-driven atmospheric water harvesting (SDAWH) presents a promising solution to address water scarcity issues, particularly in arid and semi-arid regions where ...

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