# Photothermal materials for onsite water harvesting from unconventional sources

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The accelerated increase in freshwater demand highlights the urgency in creating alternative water sources to meet the ever-increasing need for increased water supply. This is particularly critical for populations displaced in remote locations where conventional water sources and the infrastructure required to produce potable water may be intermittently or completely absent. Therefore, infrastructure-independent water technologies that are low-cost, robust with simple operations are sought. In this presentation, we highlight a standalone 3D photothermal foam that can be used to generate potable water from seawater and atmospheric moisture via interfacial solar evaporation. Specifically, the foam showed a remarkable specific evaporation rate of 11.4 kg m-2 h-1 g-1 with an energy efficiency of 92.7%. Due to the presence of hydrophilic domains within the foam, they can also be employed to capture and store water (both liquid and vapor) that can then be harvested via solar evaporation; the average amount of absorbed water vapor and liquid water harvested for each cycle were 250-1770 mg H2O per g of dry foam. The high evaporation efficiency combined with the versatility of the foam in harvesting water from varying sources enable them to produce potable water under circumstances where there is a high level of uncertainty associated with the availability and quality of water such as in the aftermath of a disaster. Considering the lightweight of the foam (bulk density of 0.2 g cm-3), they could offer a simple solution that can be rapidly deployed to produce potable water for short-term sustenance in acute emergencies.

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