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# High Throughput of Clean Water Excluding Ions, Organic Media, and Bacteria from Defect-Abundant Graphene Aerogel under Sunlight

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## ABSTRACT

Water shortage is a serious, long-standing global issue that urgently needs to be solved. Recently, various kinds of techniques have been developed for the treatment of wastewater. Among them, solar thermal conversion of steam generation is a green and sustainable approach for regeneration of clean water. Herein, we develop the solar steam generator based on the defect-abundant graphene sheets for highly efficient production of clean water with high rejection of ions, organic media, and bacteria. The thermal conductivity of defect-abundant graphene aerogel is as low as  $0.0075 \text{ W m}^{-1} \text{ K}^{-1}$  with a record surface temperature of up to *ca*  $90 \text{ }^\circ\text{C}$  under only 1 sun, which thus promotes a high water evaporation rate of  $1.78 \text{ kg m}^{-2} \text{ h}^{-1}$ . Efficient production of clean water with high rejection of ions, oil and bacteria is demonstrated, which proved the possibility for a one-step production of drinkable water from the water sources of the sea, lake, and emulsified oil/water mixtures.

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