

2018 JOINT ANNUAL CONFERENCE OF PHYSICAL SOCIETIES IN GUANGDONG-HONG KONG-MACAO GREATER BAY AREA

Title of Presentation: Solar vapor desalination of seawater

Author(s): Yangshi Jin, Chu Leung Chan and Xuming ZHANG*

Affiliation(s): The Hong Kong Polytechnic University

E-mail Address: apzhang@polyu.edu.hk

Abstract:

Solar vapor generation system has been widely used to solve global freshwater shortages. Nowadays, how to improve energy transfer efficiency is a main problem when the system is designed. Here, a Thin Salt Water Layer Tank is designed to obtain 84% solar-to-vapor conversion efficiency under non-concentrated solar illumination of $1 \text{ kW}\cdot\text{m}^{-2}$ corresponding to $1.17 \text{ kg}\cdot\text{m}^{-2}\cdot\text{h}^{-1}$ (see Fig. 1). The tank design can minimize the losses effectively under thermal equilibrium by two ways: CP-foam suppresses downward thermal radiation loss, and the upward radiation and convection loss is very small since the temperature of the adjacent environment (surrounded by the vapor) is very close to that of CP surface. So as to form a thin layer of seawater, we add several one-dollar coins around the tank to lower the level of the tank.

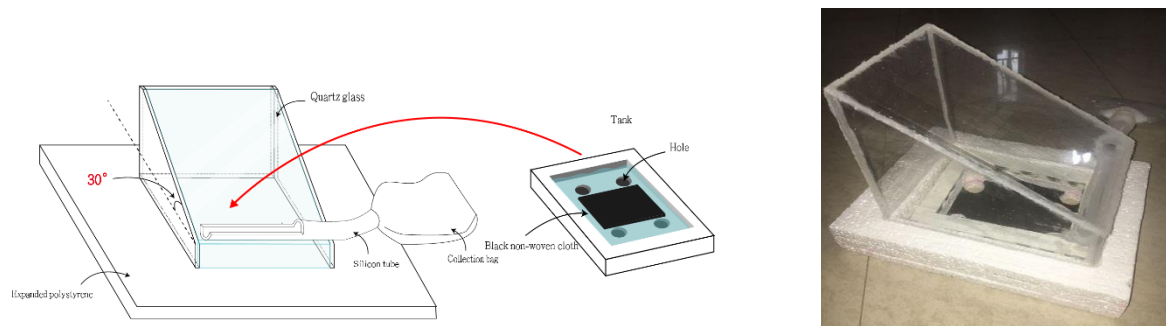


Fig. 1 Design and photo of the solar vapor desalination reactor.

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