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Sustainable passive solar seawater desalination: concepts and system configurations

Ridha Djellabi

Depart. d'Enginyeria Química, Universitat Rovira i Virgili, Av Països Catalan, Tarragona, Spain

Depart of Chemistry, Alfaisal University, Al Maather, Al Takhassusi Road, Riyadh, Saudi Arabia

* Corresponding author E-mail ridha.djellabi@yahoo.com

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Abstract

Water is the most important element in our planet for humankind's survival [1]. The World Bank group reported that about 1.6 billion people living in remote areas will not access to clean water by 2030 which make their live in danger. Design of easy-doable processes for water treatment and desalination has been the core of wide research and technological investigation over the last decades. Solar driven photothermal process, so-called solar-to-steam generation (SSG), has received a lot of attention to be used for seawater desalination. It is based, similar but accelerated to the natural hydrologic cycle [2], on the heating of surface water using light-to-heat photothermal materials to boost the evaporation of water into steam to be condensed into fresh water [3]. SSG suffers from several technology issues which face its real-world application [4]. The most challenging issue is the salt rejection and the stability of the materials in seawater conditions. This talk aims to discuss the fundamentals of SSG technology and most of research advances to solve or/and overcome the technology issues and process intensification.

Keywords: Solar-to-steam generation; Solar sweater desalination; Energy transition; Circular economy.

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