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NEW FRONTIERS IN DESALINATION PROCESS

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Abstract

The scarcity of fresh water and the need for additional fresh water is already critical in many arid regions of India. Therefore we need to have desalination on the large scale. This process has gained special importance due to high demand of potable water and due to reducing no of fresh water sources. Conventional desalination processes includes the Multi-stage flash (MSF), the Multi-effect distillation (MED), the Reverse Osmosis (RO), Electro dialysis etc.

Even though having good efficiency they have major disadvantage like high energy consumption and expensiveness. This paper has focused on three new desalination techniques

I) Solar assisted adsorption cycle for desalination

II) Desalination using biomimetic membranes

III) Desalination using carbon nanotubes (CNT's)

Solar assisted adsorption cycle is used for desalination. It employs only waste heat from the sun i.e. solar heat, typically at 55° to 85°C. With only a single thermal input it produces two useful effects, namely the high-grade purified water and cooling capacity suitable for air-conditioning. The system employs a combination of flash evaporation to generate cooling effect and desalinated water.

Desalination using biomimetic membranes: The word biomimetic implies the inspiration from biological systems. Biomimetic membranes are made from self-assembled Nano pores tuned with atomic layer deposition. Biomimetic membranes are designed to purify water using reverse osmosis (RO) technology, which removes impurities from water with applied pressure powered by electrical energy. These membranes filter out salts and larger solution components, leaving behind clean drinking water.

Desalination using carbon nanotubes (CNT's): Tip-functionalized non-polar interior home of carbon nanotubes (CNTs) provides strong invitation to polar water molecules and rejects salts and pollutants. Nanotube membranes may prove to be effective for water filtration and desalination processes that would require substantially less energy than reverse osmosis. CNTs are remarkable and amazingly important to a membranologist as they are next generation membranes with high flux, high selectivity, low fouling (hydrophilic-, hydrophobic- and bio-fouling).

A comparative study has been made among these processes with conventional desalination processes. These methods are found to be non expensive which consume comparatively less energy and are easy to operate and most importantly they are eco-friendly compared to the conventional desalination processes.

Keywords: *Desalination, Solar assisted adsorption cycle, Biomimetic membrane, Carbon nanotubes* etc.