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Oxide-activated carbon for seawater desalination using solar energy

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A B S T R A C T

Desalination of seawater is an efficient process and a viable solution for water shortage problems. This process is consuming a large amount of energy. One of the latest possible solutions with less energy consumption is the use of activated carbon for the desalination process. Activated carbon can be produced using several materials including agricultural waste. In this work activated carbon was produced from palm tree trunks. The preparation of the activated carbon was done by two steps process. The first step was the pyrolysis for 2 h at 700°C under a nitrogen gas flow of 150 ml/min. The next step was the physiochemical activation using potassium hydroxide (1:1) under nitrogen and carbon dioxide gas flow of 150 m/min for 2 h. The prepared activated carbon was analyzed using Scanning Electron Microscopy (SEM) with Energy Dispersive X-ray (EDX) to study the surface area, the porosity, and the chemical composition. The application of the activated carbon in the desalination process was done by initially oxidizing the AC to use it for the reduction of the boiling point of the seawater followed by the desalination. This was supported by the use of a solar panel to provide the required energy for evaporation. The treated water was analyzed using inductively coupled plasma optical emission spectrometry (ICP-OES). The prepared activated carbon in this study was used to produce fresh water by the desalination of seawater based on an environmentally safe and lower energy cost method, which is a promising technique that can overcome the shortcomings of the current technologies.

Keywords: Activated carbon; Oxide-AC; Desalination; Solar energy

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