

# PHOTOVOLTAIC ELECTRODIALYSIS SYSTEM FOR BRACKISH WATER DESALINATION



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## ABSTRACT

The Applied Electrochemical and Electrocatalysis Group (Institute of Electrochemistry) at the University of Alicante was created in 1983. From its creation, the aim of this research group has been the development of electrochemical processes for industrial application. Our twenty years of research have provided us with a wide experience in diverse fields of the Applied Electrochemistry, which include principally the development of new accumulators and batteries, synthesis and purification of pharmaceutical compounds and the treatment of waste water.

In agreement with increasingly important social demand during last years, one of the priority research lines of the group is the ENVIRONMENTAL ELECTROCHEMISTRY. Among the opportunities that the Electrochemistry Technology offers in the treatment of waste water, in our department we put special emphasis on the desalination of saline water from underground reservoirs for human consumption or irrigation by means of systems of electrodialysis powered by photovoltaic solar energy.

The advantages of the use of the photovoltaic power are that is non-polluting; it is also silent; the fuel-sunlight- is free, abundant and a renewable resource, decentralized; long-life and the low maintenance cost due to the fact that it includes neither accumulation batteries, nor regulators/inverter.

These systems are interesting for remote areas with access to saline underground reservoirs, where the supply of electricity is particularly expensive or even non-existent, or for coastal zones where there are saline aquifers and the water resources are scarce.

Therefore, the desalination method developed by the Applied Electrochemical and Electrocatalysis Group (LEQA) at the University of Alicante is a process free of CO<sub>2</sub>-emissions and, consequently, a sustainable way of producing drinkable water for human consumption respectful with the environment, not contributing to the climatic change, and with a minimum environmental impact.

## TECHNOLOGY ADVANTAGES AND INNOVATIVE ASPECTS

### innovative aspects

Desalination system using renewable energy, respectful with the environment, ot contributing to the climatic change.

Desalination system for remote areas with access to saline reservoirs, where he supply of electricity is particularly expensive or even non-existent, or for oastal zones where there are saline aquifers and the water resources are carce.

### main advantages of the technology

The system electro dialysis-photovoltaic generator is reliable, versatile and has low maintenance costs.

The advantages of the use of the photovoltaic power are that it is non-polluting; it is also silent; the fuel-sunlight- is free, abundant and a renewable resource, includes neither accumulation batteries, nor regulators/inverter. Electro dialysis process is more competitive than reverse osmosis process for desalination of brackish water

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### MARKET APPLICATIONS

The developed technologies could be of interest of companies, public bodies and organisations dealing with water supply problems. Companies or institutions interested in profiting water resources which come from brackish water. Users from engineering and industrial companies, waste water management firms, agricultural related companies, etc., could use this technology.

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### COLLABORATION SOUGHT

The Applied Electrochemical and Electrocatalysis Group (LEQA) is seeking for:

- Partners willing to introduce the electro dialysis - photovoltaic system in its facilities.
  - R&D departments of any company interested in carrying out feasibility studies on the use, industrial or not, of this technology.
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