

Small units for desalination of sea water by electro dialysis

PCCell GmbH, Lebacher Str. 60, 66265 Heusweiler, GERMANY

Patrick Altmeier, +49 6806 603730, email altmeier@electrodialysis.de

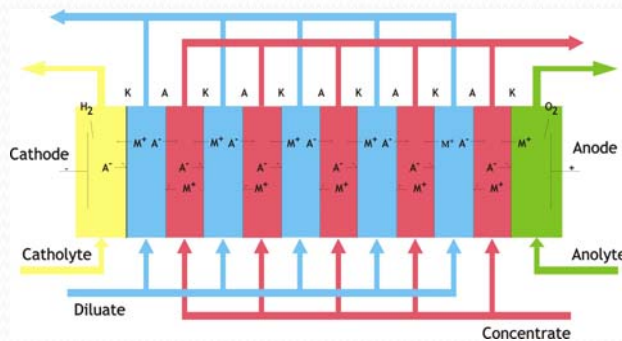


Figure 1.-the principle of electro dialysis

SEA WATER DESALINATION

PCCell develops an advanced sea water desalination device based on the ED200. The unit is designed from the model PCCell 200 and should be capable to produce 20 – 50 l/h drinking electro dialysis (Fig. 1) water. The required space for the unit will be small.

At the moment intensive research is in progress to develop a sea water desalination device based on the ED200 (Fig. 3) in a continuous mode (Fig. 2). This combination of small ED units with continuous desalination should combine low operating costs, high efficiency, long life time of membranes, low energy costs with a small technical effort.

To achieve these characteristics, membrane properties are optimised to this particular application. Renewable energies can be used to drive a plant. Technical, operational and energy costs are low. The membranes feature a high durability and a long life time and such a unit is lightweight and very compact.



Figure 3.- ED 200 stack

PROGRESS AND OBJECTIVES

PCCell focused in the beginning mainly on the development of thin anionic and cationic selective membranes which are currently tested in FTC pilot systems. These membranes show similar performance than commercially available membranes, but are about three times cheaper. Because the membranes are very thin they are not as robust as thick membranes. Therefore new methods were developed to backbone these membranes during the production process and make them usable in further production steps.

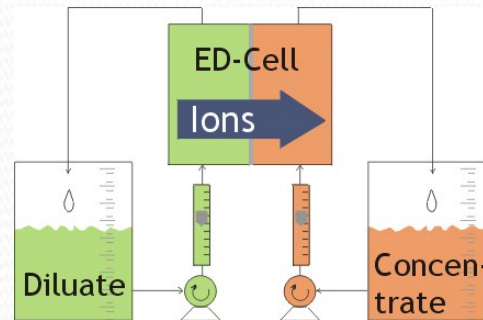


Figure 2.-electrodialysis in a continuous mode

PCCell is now working on a further cost reduction of about a factor of two, which will make those membranes highly cost effective, especially for sea water desalination. In addition spacers were developed that have better performance. These spacers have better hydraulic properties and require less energy than conventional spacers.

The collaboration between PCCell and other AquaFit4Use partners is highly successful and there is good mutual understanding of the project objectives. PCCell has delivered a first batch of ion selective materials, which are currently tested. The produced membranes are within the membrane specification, although there is some variation in membrane thickness.

PCCell is currently refining the membrane manufacturing protocol in order to produce membranes that are more homogeneous in terms of membrane thickness.

AIMS

- production of a high efficient desalination unit with low operating costs
- economic production of drinking water
- decentralisation of drinking water production under compliance of the regulations
- reduction of production cost for membranes

SIGNIFICANT RESULTS

- Development of thin, cheap membranes
- Design of the clone module to enhance production capacity
- Development of new spacers with better performance



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