



Investigation of seawater deionization using the minimization technique with electro dialysis processes (CED-BMED)

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ABSTRACT

Supplies of fresh water on earth are limited, and the rapid growth of the global population is making the search for new sources a priority. Seawater is one such source, and currently, the most widely used desalination methods include membrane processes and evaporation, although both have their disadvantages. In this study, electro dialysis (ED) processes, which have been found to be successful in terms of ion removal, are analyzed with synthetic seawater being deionized using conventional electro dialysis (ED) and bipolar membrane electro dialysis (BMED) processes where the issue of concentrate minimization – currently the most significant drawback of the membrane processes – was resolved. The concentrate was reduced to around 0.5% using the ED method, which can be considered relatively good value when compared with the findings of previous studies. Furthermore, the BMED process also produced anolyte and catholyte chamber solutions at 0.5% concentrations, but as these concentrates are acid and alkaline, it is fair to say that the process has resulted in the production of zero waste. In the following stages, Marmara seawater was deionized under optimum operational conditions, and the deionized seawater values were found to be within the drinkable water tolerances specified by the World Health Organization.

Keywords: Electro dialysis; Deionization; Concentrate; Acid–base recovery
