

Pure water production from aqueous solution containing low concentration hardness ions by electrodeionization

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ABSTRACT

The integrated membrane process of “reverse osmosis-electrodeionization (RO/EDI)” has been widely used for pure water production in recent years. However, in most cases, a single pass RO system still cannot meet the feed standards of EDI, therefore the “RO/RO” system should be applied for scale averting. In this paper, a specially designed EDI process was developed with improvements on resins packing and inner configuration, and performances of six EDI stacks with different inner configurations were investigated and compared with each other. When with feed hardness of $11.7\text{ mg}\cdot\text{L}^{-1}$ (as CaCO_3), the improved EDI process could give a hardness rejection of 99.8% while the energy consumption was as low as $0.26\text{ KW}\cdot\text{h}\cdot\text{m}^{-3}$, and the steady product resistivity that could be achieved was $14.6\text{ M}\Omega\cdot\text{cm}$. In durative experiment of 130 h, the EDI had been operated with good stability and without precipitation.

Keywords: Electrodeionization; Hardness ions; Resins; Water dissociation

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