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Fouling and scaling reduction by pulsed electric field treatment as pretreatment for desalination

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ABSTRACT

This study was conducted to investigate the applicability of pulsed electric field (PEF) treatment for the prevention of scaling formation and membrane fouling reduction as the pretreatment of reverse osmosis desalination. To validate the effect of the PEF and to identify the mechanism, a series of experiments with and without the PEF treatment were carried out. All the precipitated crystals in solution were calcite and there were slight differences between with and without the PEF by X-ray diffraction analysis. A rapid particle growth was observed in the case of the PEF treatment. Permeate volume and permeation flux were higher than those without the PEF case. The new PEF method presents an effective tool to mitigate $CaCO_3$ fouling as a pretreatment of membrane filtration.

Keywords: Pulsed electric field; Desalination; Pretreatment; Scaling; Fouling

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