Low electrode area electrochemical scale removal system

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ABSTRACT

Effective prevention of scale deposition is one of significant issues involved in desalination practice. The number of scale control techniques is rather limited. The most common scale control technique in desalination processes is based on dosage of inhibiting compounds which are able to suppress scale precipitation up to a certain degree. Electrochemical scale precipitation has long been used to reduce the hardness of water circulating in cooling tower systems. Despite its conspicuous advantages, the electrochemical scale removal technique has not been applied to-date in desalination processes because of two main limitations — high electrode area requirement and the existence of a limiting current density beyond which the precipitation rate remains unchanged. This paper presents a modified electrochemical system which overcomes the above limitations. The novel electrochemical seeds system enables drastic reduction of the electrode area requirement and has no limiting current restrictions. Data are presented showing that the specific electrode area can be reduced by a factor exceeding ten.

Keywords: Scale control; CaCO₃ removal; Electrochemical precipitation; Electrode area; Energy consumption

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