Scaling tendency assessment in reverse osmosis modules

H. Hchaicha\textsuperscript{a}, H. Elfil\textsuperscript{b}, P. Guichardon\textsuperscript{c}, A. Hannachi\textsuperscript{a,*}

\textsuperscript{a}National Engineering School of Gabes, University of Gabes, Gabes, Tunisia
Tel. +216 75392100; Fax: +216 75392190; email: ahmed.hannachi@enig.rnu.tn
\textsuperscript{b}LabTEN-Water Research and Technologies Center, Soliman, Tunisia
\textsuperscript{c}M2P2, UMR-CNRS 6181, Ecole Centrale Marseille, Universités d’Aix Marseille, Marseille, France

Received 14 March 2012; Accepted 18 July 2012

\textbf{ABSTRACT}

A mathematical model was developed to predict super saturation along reverse osmosis modules (RO) for water desalination. This model is based on conservation principles and chemical equilibrium equations for concentrated solutions. Pitzer’s model was used for the activity coefficient calculations. An average rejection rate for each ionic species was also considered. Supersaturations with respect to all calcium carbonate forms and to calcium sulfate are calculated. The model allows assessing when scale is likely to occur along the RO modules. The results for two brackish water qualities and seawater are shown.

\textit{Keywords:} Desalination; Reverse osmosis; Supersaturation; Fouling; Scaling assessment; Modelling

\textsuperscript{*Corresponding author.

Presented at the International Conference on Desalination for the Environment, Clean Water and Energy, European Desalination Society, 23–26 April 2012, Barcelona, Spain