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## The decline of scale-forming ions in seawater using pure and modified kaolinite

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Mineral scale membrane fouling is a major problem often encountered in the reverse osmosis membranes while desalination of seawater. Proper pre-treatment is the vital factor to reverse osmosis of seawater (RO). The poor feed water quality can lead to decrease in the membrane lifetime, a short period of operation, and high maintenance cost. Cost effective and eco-friendly silver nanoparticles (Ag-NPs) were synthesized using banana peel extract as the reducing agent. Ag-NPs are characterized using SEM, UV-Vis, and XRD spectroscopic techniques. Ag-NPs were synthesized promptly within 25 min of incubation period and Ag-NPs showed an absorption peak at 380-500 nm in the UV-visible spectrum. TEM and XRD spectrum confirmed the formation of metallic silver with average size 23 nm. Ag/kaolinite Nano-composite was prepared by impregnation of Ag-NPs which prepared by green synthesis. The kinetics of the adsorption of ( $Mg^{+2}$ ,  $Ca^{+2}$ ,  $Ba^{+2}$ ,  $Sr^{+2}$  and  $SO_4^{-2}$ ) ions from sea water on the pure and modified kaolinite by Ag-NPs were studied by using batch method. The adsorption capacities of pure and modified kaolinite were investigated under the variable experimental condition of; the amount of adsorbent, pH, temperature and contact time, also, the adsorption kinetic data were also determined to the pure and modified kaolinite. The results show that modification of kaolinite by Ag-NPs enhances its adsorption capacity for  $Ca^{+2}$ ,  $Mg^{+2}$ ,  $Ba^{+2}$ ,  $Sr^{+2}$  and  $SO_4^{-2}$  ions. The FTIR spectra showed that certain functional groups are responsible for binding the metal ions from solution. The nature of the modified kaolinite was revealed by the good fit of the data to the kinetic model (pseudo-second-order kinetics model are higher than those of the pseudo-first-order kinetics model), these results indicate that modified kaolinite is potentially a low-cost adsorbent for the removal of scale-forming ions from solution.

### Biography

Moshira M Salem works as an Assistant researcher in Egyptian Petroleum Research Institute (EPRI), Analysis & Evaluation Department, water analysis Laboratory. Qualified Analytical Chemist with over five years' experience in Research and Development in Analytical Chemistry in Central Lab. Services, Egyptian Petroleum Research Institute. Her primary area of expertise is in water treatment, focused on: water assessment, water treatment, nonmaterial synthesis and application etc. Possess good expertise in nanoparticle synthesis and their Characterization techniques

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