

## Hard Water Softening by Chronoamperometry and Impedancemetry

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**Abstract :** The ground water Hamma rich in calcium and bicarbonate likely to deposit the tartar and subsequently lead to the obstruction of the pipes and the seizing of the stopping devices in addition to the financial losses resulting there from. It is therefore necessary to optimise an antiscaling treatment in order to avoid the risk of formation of tartar deposits in the various installations and to protect the equipment in contact with this water.  $MgCl_2$  is the chemical inhibitor which was tested. To optimise the effective concentration of this product, we used two electrochemical methods (chronoamperometry and impedancemetry) to identify the best method for optimizing antiscaling treatment. IR, RX, Raman spectroscopy and SEM indicate that the raw waters of Hamma give precipitates in the form of calcite (the most stable form), with the presence of a small amount of magnesian calcite and aragonite. In the presence of the inhibitor ( $MgCl_2$ ), calcium carbonate changes morphology to other forms that do not exist in the deposit obtained from the raw water (vaterite and calcium carbonate monohydrate).

**Keywords :** calcium carbonate,  $MgCl_2$ , chronoamperometry, Impedancemetry

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