

"Scientific Study For Treatment & Conservation of Archaeological Iron Artifacts, Applied on A Selected Object from Tell-El Farama, North Sinai, Egypt."

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Abstract:-

Archaeological iron artifacts that are buried in soil are badly corroded; forming a red/brown rust of iron oxides and hydroxides, which are formed by very complicated series of processes and mixtures with soil. When salts are present they act as electrolytes, while the chemical reactions that cause corrosion are reinforced by electrochemical reactions and mineralization.

This work aims to study the corrosion process related to the presence of chloride ions (Cl⁻) in the soil, and to determine the best methods for their treatment. To achieve this aim a careful examination was made to determine the condition of the object before treatment. To determine the type of corrosion products XRD was used, while SEM & metallographic examinations were used to assess the internal condition of the object. Also, XRF was used for elemental determination of the object. An experimental study was made to select the best method to treat the object and an electrolytic reduction method was followed by a thermal treatment since it has a lot of advantages: it consolidates the object, extracts chlorides and reduces corrosion products. We recommend such a treatment for artifacts like these. Finally, in order to limit further deterioration, the artifact was coated with a wax.