

## Study of the Efficiency of a Synthetic Wax for Corrosion Protection of Steel in Aggressive Environments

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**Abstract :** The remarkable properties of steel, such as hardness and impact resistance, motivate their use in the automotive manufacturing industry. However, due to the very vulnerable environmental conditions of use, the steel that makes up the car body can corrode. This situation is motivating more and more automobile manufacturers to develop research to develop processes minimizing the rate of degradation of the physicomechanical properties of these materials. The present work falls within this perspective; it presents the results of a research study focused on the use of synthetic wax for the protection of steel, type XES (DC04), against corrosion in aggressive environments. The media used in this study are an acid medium with a pH=5.6, a 3% chloride medium, and a dry medium. Evaluation of the protective power of synthetic wax in different environments was carried out using mass loss techniques (immersion), completed by electrochemical techniques (stationary and transient). The results of the immersion of the steel samples, with a surface area of (1.44 cm<sup>2</sup>), in the various media, for a period of 30 days, using the immersion technique, showed high protective efficiency of synthetic wax in acidic and saline environments, with a lesser degree in a dry environment. Moreover, the study of the protective power, using electrochemical techniques, confirmed the results obtained in static mode (loss of mass), the protective efficiency of synthetic wax, against the corrosion of steel, in different environments, which reaches a maximum rate of 99.87% in a saline environment.

**Keywords :** corrosion, steel, industrial wax, environment, mass loss, electrochemical techniques

**Conference Title :** ICMEES 2023 : International Conference on Materials Electrochemistry and Electrochemical Synthesis

**Conference Location :** Cairo, Egypt

**Conference Dates :** December 18-19, 2023