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Influence of environmental factors on atmospheric corrosion in dynamic environment

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Highlights

- A new corrosion prediction model incorporating the effects of multiple dynamic climate factors is proposed.
- The multi-parameter method is accurate to describe the dependence of humidity on temperature.
- Correction factors calculated with the new model are close to the real value.
- The nonlinear accelerating effects of humidity and temperature are remarkable.

Abstract

This paper studies the effects of relative humidity, temperature, sulphur dioxide, and chlorides on the short-term corrosion behavior in the dynamic environment. A multi-parameter method is developed to characterize the statistical distributions of the environmental factors with high accuracy. The results suggest that *TOW* (time-of-wetness) should be replaced by temperature and relative humidity distributions. A corrosion model which is combined with physical and empirical knowledge of corrosion is presented and gives more accurate corrosion estimation than using the mean values of the environmental factors and fitting them independently. It is also demonstrated that relative humidity is the most influential factor on corrosion and temperature is secondary. The nonlinearity of their accelerating effects on corrosion rate are remarkable and should be considered

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