

In-situ spectroscopy measurements on carbon steel under cathodic protection

Federico Martinelli-Orlando, Ueli Angst
ETH Zurich, Zurich, Switzerland

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Abstract

Cathodic protection (CP) is an electrochemical technique used to reduce corrosion rate of carbon steel to negligible values. Despite the worldwide use of this technique for protecting underground structure for almost 100 years, the working mechanism of CP is still under debate. The aim of this work is to verify with in-situ spectroscopy measurements, the formation of a passive film on carbon steel during CP. In this study active reflectance spectroscopy (ARS) and electrochemical impedance spectroscopy (EIS) measurements were used to verify the passive film formation in CP. The increase in absorbance in the UV region and the increase in the polarization resistance (R_p) suggest the formation of passive film on the steel surface under cathodic polarization.