SECM Investigation of the Effects of Hydrogen on the Pitting Processes of X70 Carbon Steel in Simulated Soil Solution

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Effects of hydrogen on the dynamic pitting processes of X70 carbon steel in simulated soil solution were investigated by electrochemical methods and scanning electrochemical microscopy (SECM). With increased hydrogen-charged (H-charged) current, corrosion potential shifts negatively and corrosion current increases. A polyaniline microelectrode has been used in SECM to observe the dynamic pH changes at the electrode | electrolyte interface. The results show that decreased pH at the interface corresponds to the occurrence of pitting. It can be concluded that hydrogen is absorbed into the X70 unevenly and reduces interface pH to induce pitting.

Keywords: X70 carbon steel; Polyaniline-modified Pt microelectrode; H-charged; SECM; Pitting

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