Short Communication

Effect of the Local Damage of a Sulfide Film Formed on Steel Surfaces in H₂S Environments

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The electrochemical corrosion behavior of X80 pipeline steel in distilled water with saturated H₂S at 323 K was evaluated, and the corrosion products were characterized. The results showed that mackinawite and cubic FeS were the primary and secondary crystalline phases observed, respectively. In addition, a series of changes in their size and shape occurred during the immersion processes. The sulfide film that formed on the steel surfaces enhanced the corrosion resistance. Moreover, zero resistance ammeter measurements showed that the galvanic effect was introduced between the fresh and sulfide film-covered steel electrodes, and then it decreased, and disappeared, indicating that substantial local corrosion cannot be introduced because of the local damage of the sulfide film.

Keywords: hydrogen sulfide corrosion; electrochemical corrosion; galvanic effect

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