

Short communication

Influence of cooling treatment on corrosion behaviour of steel EH40 in extremely cold seawater

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The corrosion resistance of low-temperature steel EH40 with and without cooling treatment was investigated after salt spray testing under artificial conditions. The surface morphologies, chemical compositions, and corrosion rates of low-temperature steels EH40 were respectively analyzed by scanning electron microscopy (SEM), energy dispersive spectrometry (EDS), and mass loss method. Electrochemical impedance spectroscopy (EIS) measurements were employed to examine the effect of the cooling treatment on the corrosion mechanism of EH40. The results showed that pitting corrosion occurred for the steels subjected to cooling treatment at -80°C, which further accelerated their corrosion behaviors. By contrast, a uniform corrosion pattern was observed on the steel samples unsubjected to the cooling treatment. In the latter case, the formation of passive films on the steels surfaces lowered the rates for further corrosion.

Keywords: EH40 steel; Cooling treatment; Low-temperature seawater corrosion; Pitting

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