Effect of Quenching and Tempering Temperature on Corrosion Behavior of Boron Steels in 3.5 wt.% NaCl Solution

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doi: 10.20964/2019.03.22

Received: 1 December 2018 / Accepted: 7 January 2019 / Published: 7 February 2019

This study was carried out to examine the impact of austenitization and tempering temperatures on the corrosion characteristics of boron steels. Boron steel samples were austenitized at 850 °C, 900 °C, and 950 °C, and then quenched in environmental water. After quenching, the samples were tempered at 150 °C, 300 °C, and 450 °C for 30 minutes to prepare specimens. The corrosion characteristics of quenched and tempered boron steels in a 3.5 wt.% NaCl solution were examined using Tafel extrapolation method. Significant statistical differences have been observed between the tested boron steels in terms of corrosion rate. Changing C concentration affected the corrosion rates of boron steels after their immersion into a 3.5 wt% NaCl solution and increasing C content generally accelerated the corrosion rate. A poor correlation has been found between average ferrite grain size and corrosion rate under the examined heat treatment conditions for tested boron steels.

Keywords: Boron steel corrosion rate, heat treatment, Tafel extrapolation, electrochemical parameters, ferrite grain size.

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