

عنوان مقاله:

The Effect of Tempering Treatment on the Microstructure and Mechanical Properties of DIN ۱.۴۰۲۱ Martensitic Stainless Steel

محل انتشار:

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خلاصه مقاله:

To investigate the effect of tempering treatment on mechanical properties and the microstructure of DIN ۱.۴۰۲۱ Martensitic Stainless Steel, austenite treatment was conducted for the samples at ۱۰۰۰ °C temperature for ۶۰ min and then the samples were oil quenched. Later, tempering treatments were performed for the samples at ۵۰۰ °C and ۷۰۰ °C temperatures for ۲ and ۵ h, respectively; then quenching in oil was conducted. After the heat treatment, hardness, tensile strength and impact tests were performed to investigate mechanical properties. Moreover, optical microscopy and field emission scanning electron microscopy (FESEM) were performed to investigate microstructure observations and fracture surfaces. X-Ray diffraction (XRD) was carried out to measure the austenite retained in the samples. The results showed that due to the formation and precipitation of alloy carbides Cr₇C₃, the tempering treatment at a temperature of ۵۰۰ °C increases hardness, tensile strength and yield strength and reduces the amount of impact energy of the samples as well.

کلمات کلیدی:

DIN ۱.۴۰۲۱, Martensitic stainless steel, Temper, Mechanical properties, FESEM

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