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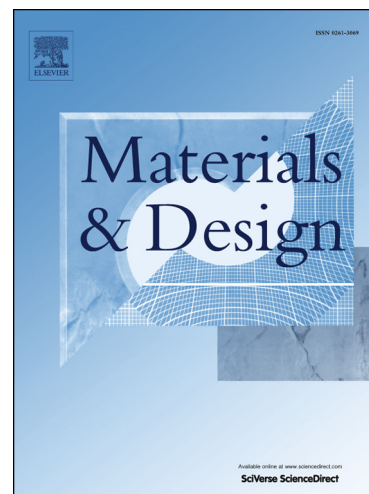
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## Corrosion behavior of friction stir welded lean duplex stainless steel

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### Abstract

The corrosion behavior of a friction stir welded lean duplex stainless steel was investigated in H<sub>2</sub>SO<sub>4</sub> solution. Friction stir welding (FSW) was performed at a constant rotation speed of 800 rpm and welding speeds of 50, 100 and 150 mm.min<sup>-1</sup> using WC-based tool. The corrosion evaluations were carried out through open circuit potential measurements, potentiodynamic polarization and immersion tests. Also, the semiconducting properties of the passive films were studied by Mott-Schottky analysis. It was demonstrated that increasing the welding speed decreased the grain size of the  $\alpha$  and  $\gamma$  phases and improved the corrosion resistance of the stir zone (SZ). According to Mott-Schottky analysis, it was found that the calculated donor density decreased with decreasing the grain size of the stir zone. These observations were consisted with the results of the immersion tests, evidencing that the passivation behavior of the stir zone enhanced with decreasing the grain size.

**Keywords:** Friction stir welding, Duplex stainless steel, Corrosion properties, Microstructure

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