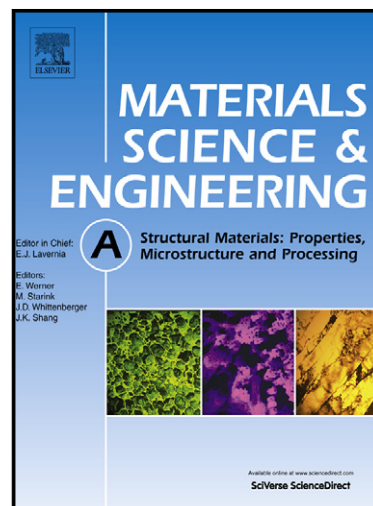


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Effects of ferrite content on the mechanical properties of thermal aged duplex stainless steels

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ABSTRACT

The duplex stainless steels (DSS), solution treated at 1080 °C for different hours, were further thermal aged at 400 °C for as long as 3000 h to evaluate the effects of ferrite content on the thermal aging behaviors. For the unaged DSS, high content of ferrite is helpful to enhance the mechanical properties. After thermal aging for 3000 h, the impact energies of DSS are found to decrease with increase in ferrite content. Extending solution time in the single-phase austenitic region can decline the ferrite content and improve the distribution and shape of ferrite phases. The compositions of undissolved ferrite during this solution process have no obvious change, and thus the thermal aging kinetics are not affected. For the long-time served DSS components, solution treatment in the single-phase austenitic region for a relatively longer time is helpful to enhance the resistance of thermal aging embrittlement.

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