Effect of Solution Annealing on Austenite Morphology and Pitting Corrosion of Super Duplex Stainless Steel UNS S 32750

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The pitting corrosion resistance of super duplex stainless steel (SDSS) varies depending on heat-treatment conditions. Therefore, in this study, the volume fraction and morphology of austenite on SDSS were controlled in 6 samples, and the effect on the pitting corrosion after solution annealing was analyzed to of the critical pitting temperature (CPT). The pitting-resistance equivalent (PRE = wt % Cr + 3.3 wt % Mo + 16 wt % N) was became equal by solution annealing, but the CPT exhibited varying values. Despite heat treatment of the solution annealing, the CPT increased by 15.9 °C from 67.5 °C to 83.4 °C. The solution annealing removed the segregation of the chemical composition and assisted in improving the PRE; however, it not removed in a non-uniform morphology of austenite. Therefore, the corrosion resistance of SDSS can be optimized by appropriately controlling the morphology of austenite during the manufacturing process.

Keywords: Solution annealing, Austenite morphology, Volume fraction, Pitting corrosion, Super duplex stainless steel.

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