

A Study of the Weld Properties of Inconel 625 Based on Nb Content

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Abstract : In this study, shielded metal arc welding was performed as a function of Nb content at 2.24 wt%, 3.25 wt%, and 4.26 wt%. The microstructure was observed using scanning electron microscopy/energy dispersive X-ray spectroscopy (SEM/EDS) and showed the development of a columnar dendrite structure in the specimen having the least Nb content. From the hardness test, the hardness value was confirmed to reduce with decreasing Nb content. From electron backscatter diffraction (EBSD) analysis, the largest grain size was found in the specimen with Nb content of 2.24 wt%. The potentiodynamic polarization test was carried out to determine the pitting corrosion resistance; there was no significant difference in the pitting corrosion resistance with increasing Nb content. To evaluate the degree of sensitization to intergranular corrosion, the Double Loop Electrochemical Potentiodynamic Reactivation(DL-EPR test) was conducted. A similar degree of sensitization was found in two specimens except with a Nb content of 2.24 wt%, while a relatively high degree of sensitization was found in the specimen with a Nb content of 2.24 wt%.

Keywords : inconel 625, Nb content, potentiodynamic test, DL-EPR test

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