Effect of welding process on the corrosion resistance of 2205 duplex stainless steel overlays

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Abstract 2205 DSS is widely used in nuclear power materials because of its good corrosion resistance and its welding technology.In order to investigate the effect of welding process 2205 duplex stainless steel overlay layer corrosion resistance, in this study, six different welding processes were used to overlay 2205 DSS.Pitting susceptibility test and galvanic coupling corrosion test were also carried out on the specimens of these six welding processes by electrochemical test, immersion test and SKPFM test.The constant potential results show that wire quality and heat input have a limited effect on joint corrosion resistance, whereas the sequence of filler welds has an effect, and that flux-skinned electrodes may introduce hydrogen, which has a significant detrimental effect on joint corrosion resistance.Immersion experiments show that the pitting resistance of the welded joints is lower than that of the base material, and the presence of a large number of carbides in the area of the filler weld, which makes the welded area more sensitive to pitting corrosion compared to the base material. In the galvanic coupling corrosion experimental tests found that the 2205 DSS filler layer and titanium plate galvanic coupling effect in actual service on the corrosion effect is basically negligible.

Keywords Duplex stainless steel,Welding process,pitting,galvanic corrosion

Reference

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