Abstract

The present work has been carried out to study the sensitization behavior of AISI 304L austenitic stainless steel weld, fabricated using GTAW (gas tungsten arc welding process). This weld was subjected to post weld thermal aging (PWTA) treatments lying in the sensitization range, viz. 700 °C for 30 minutes, 500 minutes and 1000 minutes for studying the influence of carbide precipitation on their metallurgical and corrosion properties. Microstructural studies of these weldments showed that all welds were essentially austenitic with the presence of a small amount of ?-ferrite. The microstructure of the welds was dendritic and ?-ferrite phase placed in interdendritic regions. The weld metal exhibits largely vermicular morphology of ?-ferrite, and
when it was subjected to different PWTA treatments, carbide precipitation occurred along the ε-γ interface, the extent of which increases as the aging time increases. The heat affected zones (HAZ) of the welds, besides undergoing excessive grain coarsening during welding, played a significant role in contributing towards overall sensitization of these joints. Microhardness of the weldments (weld metal and HAZ) decreases as the aging time increases due to the reason that the matrix becomes depleted in solution strengtheners C and Cr, which contribute towards carbide precipitation. Corrosion studies conducted through measuring the degree of sensitization (DOS) of the weldments. It was found that the overall DOS of the joints increases as the post weld thermal aging time increases.

References

Sensitization Behavior of Gnaw Austenitic Stainless Steel Joints


Index Terms

Computer Science  Information Sciences

Keywords

Aisi 304l Ss; Gtaw; Sensitization; ?-ferrite; Dos.