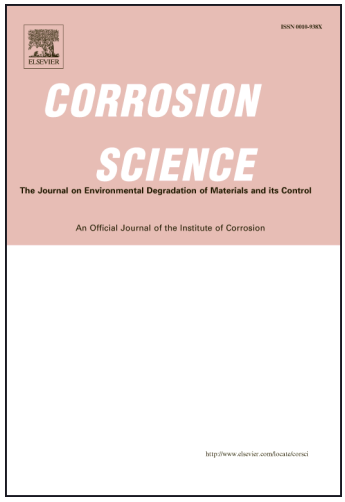

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In-situ investigation of thermal aging effect on oxide formation in Ni-base alloy/low alloy steel dissimilar metal weld interfaces

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ABSTRACT

The thermal aging effect on the formation of oxide films at the interfaces of nickel-base alloy/low alloy steel dissimilar metal welds has been analyzed by in-situ Raman spectroscopy. Experimental conditions were controlled so as to simulate a pressurized water reactor primary water condition, with in-situ spectra recorded at 300°C for 50h. The results indicate the formation of Cr_2O_3, Fe_3O_4, and $FeCr_2O_3$ in as-welded samples, whereas thermal aging is found to form $NiCr_2O_4$ and $NiFe_2O_4$. In this study, therefore, it is determined that the thermal aging creates a susceptibility to stress corrosion cracking that is not present in the as-welded sample.

Keywords: A. Alloy; A. Low Alloy Steel; B. Raman spectroscopy ; B. SEM ; C. High temperature corrosion ; C. Welding

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