

Cyclic Oxidation Behaviour Of A Ni-Mo-Cr Alloy At 800 Degrees

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Summary

The oxidation behaviour of a wrought Ni-Mo-Cr alloy was studied under thermal cyclic conditions in air at 800degreesC for exposure periods of up to 1,000 h. The morphologies, microstructures and compositions of the oxide scales were characterized by scanning electron microscopy, energy dispersive X-ray spectroscopy and X-ray diffraction. Oxidation kinetics were determined by weight gain measurements. Results show that steady-state oxidation was achieved within 1 h of exposure while partial scale spalling was observed after 400 h. The alloy grain boundaries intersecting the alloy surface showed preferential oxidation. They became depleted in Ni and enriched in Mo and Cr during transient oxidation. The scale initially formed at the surface was NiO which grew outwardly and laterally to cover the entire alloy. Upon continued oxidation, the scale developed into an outer NiO layer and an inner Cr₂O₃ layer while the presence of NiMoO₄ was also observed within the scale.

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