
A study on the oxidation behavior of Inconel 601 at elevated temperature and with Oil

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Résumé

This study was conducted with the aim to investigate the high temperature oxidation behavior of Inconel 601 which has excellent high temperature corrosion resistance. The oxidation during annealing of austenitic Inconel 601 was studied, under a protected atmosphere containing hydrogen and nitrogen. A drop of oil CONDAMAX ALS is placed at the interface of the Inconel 601. The purpose is to determine the oxidation mechanism of the Inconel 601 with the presence of oil, under a temperature of 1040°C, and during 20 minutes. Scanning Electron Microscope (SEM), Energy Dispersive X-ray Spectroscopy (EDS), and Raman Microscope (RM) were used to determine the different oxides present as well as their influences on crack formation. Although the annealing was performed in a protected atmosphere, results show the presence of an external oxide film mainly composed of and an inner layer which dominantly consisting of. Chemical analyses show that a high quantity of chromium diffuses to form oxides at the interface of the Inconel 601. Results show that oxygen coming from oil at a high temperature generates oxides formation. The latter are responsible for cracks propagation in the Inconel 601. Experiments were performed to investigate their influences on the weakening of this material.

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