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Performance of fe-33ni-18cr alloy at high temperature oxidation

Abstract

This paper investigates the performance of Fe-33Ni-18Cr alloy at high temperature oxidation. The samples were isothermally oxidized at three different oxidation temperatures, namely, 600 °C, 800 °C and 1000 °C for 150 hours. This alloy was ground by using several grits of SiC paper as well as weighed by using analytical balance and measured by using Vernier caliper before oxidation test. The characterization was carried out using scanning electron microscope (SEM) equipped with energy dispersive x-ray (EDX) and x-ray diffraction (XRD). The results show that, the higher oxidation temperatures, the weight gain of the samples were increase. Sample of 1000 °C indicate more weight gain compared to samples oxidized at 600 °C and 800 °C. The kinetic of oxidation of all samples followed the parabolic rate law. The surface morphology of oxide scale at lower temperature is thin and form a continuous layer, while at high temperature, the oxide scale develops thick layer with angular oxide particles.

Keywords

Alloy 800H; Fe-33Ni-18Cr alloy; High temperature oxidation; Isothermal oxidation; Ni-based superalloys