

High Temperature Oxidation Behavior of Fe-Ni-Al Alloy

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Abstract—*Fe-Ni-Al alloy (Ternary) and Fe-Ni alloy (Binary) were prepared by powder metallurgy route in the present work. The composition and microstructure of the samples (before & after Oxidation) were characterized by X-ray diffraction (XRD) and Field emission scanning electron microscope (FE-SEM/EDS). The kinetics of high temperature oxidation behavior is based on thermogravimetry analysis (TGA). The results of high temperature oxidation behavior in air at 900°C in cyclic (30 hrs) and isothermal 13 (hrs) conditions revealed that the oxidation rate of the prepared samples in cyclic oxidation is greater than the isothermal oxidation. The reason might be because of the development of thermal stresses, induced due to mismatch of lattice parameter of different oxide scale. The Fe-Ni-Al alloy showed better performance of high temperature oxidation as compared to Fe-Ni due to presence as Al reservoir and the formation of Al₂O₃ and spinel of NiAl₂O₄ in scale. The mechanism of oxidation behavior is discussed in the present work.*

Keywords: XRD, FE-SEM/EDS; Cyclic high temperature Oxidation; Scale spallation.