

OXIDATION PERFORMANCE OF Al_2O_3 -40% TiO_2 COATING ON NICKEL AND COBALT BASED SUPER ALLOYS AT 800 °C

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ABSTRACT

High temperature oxidation is a major problem for any equipment ranging from gas turbines, boilers, and heat treating retorts to heat exchangers. Superalloys are used for high temperature applications but these alloys are not able to fulfill both the required mechanical properties and high temperature oxidation resistance. The present investigation aims to evaluate the high-temperature oxidation behavior of Nickel and Cobalt based superalloys (AE435, Superco605). The superalloy specimens were exposed to air at 8000C under cyclic condition. Each cycle consists of keeping the sample for one hour at 8000C followed by 20 minutes cooling in ambient air. The oxidation test has been carried out for total duration of 50 cycles. The samples have been coated by Al_2O_3 -40% TiO_2 by low velocity oxy fuel (LVOF) process. The kinetics of oxidation of coated and bare superalloys has been established with the help of weight change measurements. The as sprayed coating has been characterized for microhardness, surface roughness, SEM and XRD analysis. The LVOF process was used to formulate the coating which was found Successful and adherent to the substrate. The Superco605 have shown better resistance to oxidation in comparison to AE435.

Keywords: Superalloys, LVOF, Coating, Oxidation, Parabolic Rate Constant, SCM

