

Chinese Physics B

The Study of Microstructure and Oxidation Behavior at 1,173K of Austenitic Stainless Steels by Cr and Ni Addition

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This work aim to study the effect of Chromium and Nickel addition to improve the oxidation behavior of austenitic stainless steels at 1,173 K. The results show that Chromium addition provide the best oxidation resistance property, similar to the case of Nickel addition, which can increase the oxidation resistance of the austenitic stainless steels. However, the composite of Chromium and Nickel addition case offers the lowest oxidation resistance. The results from XRD shows that the compositions of oxide scale change from Cr_2O_3 to Cr_2O_3 , Fe_2O_3 , $NiFe_2O_4$ and $Ni(Cr_2O_4)$. The oxidation behavior follows the parabolic rate law; $W = ktn$, where W = weight gain (g/cm^2), t = time (s), k is the exponential rate constant and n is the exponent of growth rate. The n values are between 0.31-0.97.

Keywords: Oxidation, Chromium, Nickel, Austenitic stainless steel

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