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Effect of Cr and Y₂O₃ on the oxidation behavior of Co-based oxide dispersion strengthened superalloys at 900 °C

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Highlights

- Oxidation of Co-based oxide dispersion strengthened alloys were characterized at 900 °C in air.
- Influences of Cr and Y₂O₃ addition on the oxidation behavior were investigated.
- Alumina-forming Co-based ODS superalloys were developed to be used at elevated temperature.

Abstract

In order to study the effect of Cr and Y₂O₃ addition on the oxidation behavior of novel Co-20Cr-10Al (wt.%) oxide dispersion strengthened (ODS) superalloys, an isothermal oxidation test was carried out at 900 °C in air. The addition of Cr altered the oxide scale from the multilayered scale with an external Co oxide / CoAl₂O₄ and an inner Al₂O₃ to a single Al₂O₃ scale. Y₂O₃ addition increased oxidation mass gain slightly but improved spallation resistance of the external Al₂O₃ scale.

Keywords

A. Cobalt; A. Alumina; B. EPMA; C. Oxidation

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