

## Hot corrosion behavior of two powder metallurgy superalloys

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**Abstract:** Hot corrosion behavior of a powder metallurgy superalloy and FGH96 at 700 °C, 750 °C and 800 °C are investigated with weight gain measurements, X-ray diffraction (XRD), scanning electron microscopy (SEM), and electron probe micro analysis (EPMA). The results show that the gas hot corrosion mechanism of the two alloys is accelerated oxidation, while the hot corrosion with corrosive salts mechanism is combined oxidation and sulfuration. Compared with FGH96, the increased Co and Al content in the new alloy with better hot corrosion resistance, especially at 800 °C. The increased Co and Al content in the new alloy promoted the rapid formation of continuous Cr<sub>2</sub>O<sub>3</sub> and Al<sub>2</sub>O<sub>3</sub> protective films on the alloy surface. Moreover, the high Co content can inhibit internal oxidation of Al and reduced internal diffusion of S through the third element effect, making Al<sub>2</sub>O<sub>3</sub> oxide film complete and continuous, thereby protecting the alloy matrix and reducing the rate of alloy oxidation of sulfuration.

**Key words:** powder metallurgy superalloy; hot corrosion; oxidation; sulfuration