

论文

微晶化对高温合金K38G在CO气氛中腐蚀的影响

王福会;D.J.YOUNG

中国科学院金属腐蚀与防护研究所金属腐蚀与防护国家重点实验室;沈阳110015

摘要: 研究了高温合金K38G在850-1000℃下CO气氛中的腐蚀以及微晶化对高温合金K38G在CO气氛中腐蚀的影响结果表明: 铸态K38G合金在CO气氛中表面形成Cr<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>和Cr<sub>7</sub>C<sub>3</sub>, 合金发生严重的内腐蚀, 腐蚀动力学基本符合抛物线规律; 而K38G微晶涂层表面形成单一的Al<sub>2</sub>O<sub>3</sub>膜, 涂层未出现内腐蚀、其腐蚀增重仅为铸态合金的(1/3) - (1/5)可见微晶化大幅度提高了K38G合金在CO气氛中的抗腐蚀性能。

关键词: K38G合金 微晶 CO气氛 腐蚀

EFFECT OF NANOCRYSTALLIZATION ON THE CORROSION RESISTANCE OF K38G SUPERALLOY IN CO ATMOSPHERE

WANG Fuhui (Institute of Corrosion and Protection of Metals, Chinese academy of Sciences, Shenyang 110015) D.J.Young (School of Materials Science and Engineering, University of New South Wales, Sydney 2052, australia)

Abstract: Corrosion resistance of the cast superalloy K38G and its sputtered nanocrystalline coating was investigated in CO in the temperature range 850-1000℃. The methods included thermogravimetric measurements, X-ray diffraction, and SEM with EDaX. The results indicated that the cast K38G alloy formed Cr<sub>2</sub>O<sub>3</sub> and TiO<sub>2</sub> scales, which followed parabolic rate law at any temperature in CO. The sputtered K38G nanocrystalline coating, however, formed Al<sub>2</sub>O<sub>3</sub> scale as a result of the enhancement of the selective oxidation of aluminium by nanocrystallization. The weight gain of the nanocrystalline coating is about 3-5 times smaller than that of the cast alloy. Therefore nanocrystallization significantly improves the corrosion resistance of K38G superalloy.

Keywords: corrosion CO atmosphere K38G alloy nanocrystallization

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通讯作者:

作者简介:

作者Email:

参考文献:

- 1 Wagner C. Z Elektrochem. 1959; 63: 772
- 2 Giggens C S ,Pettit F S. Trans Metall aIME 1969;245:2509
- 3 Yurek G J ,Eisen D,Garratt-Reed a.Metall Trans,1982;a13:473
- 4 Merz M D. Metall Trans, 1979; a10:71
- 5 Baer D R,Merz M D.Metall Transt 1980;a11:173
- 6 Basu S N Yurek G J.Oxid Met,1991;35:441
- 7 Prtater J T,Bradly E R Baer D R.J Electrochem Soc,1986;133:821
- 8 Lou H,Wang F,Xia B Zhang L.Oxid Met,1992;38:299
- 9 Lou H,Zhu S,Wang F.Oxid Met,1995;43:317
- 10 Lou H,Wang F, Zhu S, Xia B, Zhang L Sur f Coat Technol, 1994; 63: 105
- 11楼翰一,王福会,夏邦杰,张立新.腐蚀科学与防护技术,1993;5:101
- 12楼翰一,朱圣龙,王福会.腐蚀科学与防护技术,1993;5:203

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1. 耿树江, 王福会, 朱圣龙 .K38G合金及其纳米晶涂层在900℃熔融硫酸盐中的热腐蚀行为[J]. 金属学报, 2002,38(8): 871-876
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