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**摘要:** 用热重分析法测定了氧化动力学曲线, 并采用XRD和SEM(EDAX)等手段, 研究了Ni<sub>12.59</sub>Cr<sub>6.74</sub>Ta<sub>4.04</sub>Al<sub>5.16</sub>Co<sub>1.35</sub>Mo<sub>6.29</sub>W合金在900°C和1000°C的高温氧化行为。结果表明, 在氧化初期合金的氧化质量增加较快, 随着氧化时间的延长质量增加的速率逐渐降低, 其氧化动力学曲线符合抛物线规律。在900°C和1000°C氧化形成的氧化膜由三层组成, 外层为Cr<sub>2</sub>O<sub>3</sub>, Al<sub>2</sub>O<sub>3</sub>, (Ni, Co)Cr<sub>2</sub>O<sub>4</sub>和CrTaO<sub>4</sub>; 中间层为平直的Al<sub>2</sub>O<sub>3</sub>层; 内氧化层为Al<sub>2</sub>O<sub>3</sub>。在合金的氧化期间, 分布在中间层的富Ta相可抑制基体中Al向外扩散, 并抑制氧化膜的生长, 使氧化速度降低。

**关键词:** 金属材料 镍基合金 高温氧化 氧化动力学**Isothermal Oxidation Behaviour of Ni - Cr - Ta - Al - Co - Mo Alloy at 900°C and 1000°C**LU Xudong<sup>1,2</sup>, TIAN Sugui<sup>2</sup>, YU Xingfu<sup>2</sup>, WANG Changxin<sup>1</sup>

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**Abstract:** Abstract: By means of measuring the kinetics curves of the oxidation and analysis method of TGA, XRD and SEM/EDAX. An investigation has been made into the oxidation behaviour of a nickel-based superalloy at 900°C and 1000°C in air. Results show that the kinetics curves of the alloy oxidizing obey the parabola regularity, and the rate of the mass gaining decrease gradually as the oxidizing time prolongs, and the oxidizing process is mainly controlled by the formation of Cr<sub>2</sub>O<sub>3</sub> and Al<sub>2</sub>O<sub>3</sub> phases. After oxidized at 900°C and 1000°C, the oxide scales in the alloy consists of three layers, including the outer, middle and internal oxidizing layers, Cr<sub>2</sub>O<sub>3</sub> and a few (Ni,Co)Cr<sub>2</sub>O<sub>4</sub> phases are included in the outer oxide layer, the intermediate layer consists of CrTaO<sub>4</sub> phase, and the internal oxide layer is identified as Al<sub>2</sub>O<sub>3</sub> phase. In the period of the alloy oxidizing, the phase containing Ta-rich may restrain the element Al in the matrix diffusing outward, which restrains the growth up of the oxide scales to decrease the oxidizing rate of the alloy.

**Keywords:** metallic materials Ni - based superalloy high temperature oxidation oxidizing kinetics**收稿日期** 2010-06-03 **修回日期** 2010-12-13 **网络版发布日期** 2011-08-16

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