

论文

Fe—Y合金在600—800℃空气中的氧化行为

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摘要:

研究了Fe—Y合金及纯Fe在600~800℃空气中氧化行为,纯Fe在三个温度下的氧化均符合抛物线规律,Fe—Y合金的氧化除在500℃挖主符合抛物线规律外,共作弊是呈阶段性变化,Fe—Y合金氧化速度明显低于纯Fe,在700~800℃情况下,Fe—Y合金表面形成外层为Fe的氧化物(Fe₂O₃, Fe₃O₄和FeO),以为FeO和YFeO₃的混合物的氧化膜结构,在600℃下,氧化产物主要为Fe₂O₃、Fe₃O₄和Y₂O₃.其中FeO在Fe的氧化物中所占比例较小.在三个温度下,Fe-Y合金均发生明显的内氧化.讨论了Y对Fe-Y合金氧化行为的影响.

关键词: 二元合金 氧化 铁钎合金

OXIDATION OF Fe-Y ALLOYS AT 600-800°C IN AIR

Abstract:

The oxidation behaviors of Fe-Y alloys containing 2at% and 5at. %Y respectively and pure iron have been studied at 600--800°C in air. Fe-2Y and Fe-5Y alloys were oxidized slower than pure Fe at the three temperatures. The oxidation of pure iron followed a parabolic rate law. The oxidation of Fe-Y alloys at 600°C followed an approximately parabolic rate law, but not at 700 and 800°C where the oxidation went through several stages with quite different rates. The oxide scales grown on Fe-2Y and Fe-5Y alloys at 700 and 800°C were composed of an external pure Fe oxides containing Fe₂O₃, Fe₃O₄ and FeO among which FeO constituted the main iron oxides, and an inner mixture of FeO and YFeO₃. The scales grown on Fe-2Y and Fe-5Y at 600°C mainly consisted of Fe₂O₃, Fe₃O₄ and Y₂O₃ with little FeO. Significant internal oxidation in both Fe-Y alloys was observed at the three temperatures. The Y-containing oxides followed the distribution of the original intermetallic compound phase in the alloys. The effects of Y on the oxidation of pure Fe are discussed.

Keywords: binary alloys pure Fe Fe-Y alloys oxidation

收稿日期 1900-01-01 修回日期 1900-01-01 网络版发布日期 1999-09-25

DOI:

基金项目:

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参考文献:

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