

论文

FeAl金属间合金在熔融 (Li, K) 2CO3中的腐蚀电化学阻抗谱研究*

王文,曾潮流,吴维tao

中科院金属所

摘要:

采用电化学阻抗谱研究了FeAl 金属间化合物在650℃熔融(Li,K)2CO3中的腐蚀行为.结果表明,在腐蚀初期,合金腐蚀电化学阻抗谱表现为典型的扩散控制的特征;随着腐蚀的进行,其电化学阻抗谱则由两个容抗弧组成.提出了相应的等效电路,解析了电化学阻抗谱,并讨论了合金腐蚀机制.

关键词: FeAl (Li K)2CO3 熔融盐腐蚀 电化学阻抗

STUDY ON ELECTRO CHEMICAL IMPEDANCE SPECTRUM OF FeAl INTERMETALLIC COMPOUND DURING CORROSION IN MOLTEN (Li,k)2CO3

Wen Wang,,

中科院金属所

Abstract:

Electrochemical impedance spectrum(EIS)was wmployed to study the corrosion of FeAl in molten (Li,K) 2CO3 at 650℃.It is shown that the EIS exhibited the characteristics of diffusion-controlled reaction at the initial corrosion stage,while it was composed od two capacitance loops during wxtended corrosion.The corrosion of FeAl at the initial stage was controlled by the diffusion of oxidants O2 and O22- formed by the chemical dissolution of oxygen in the melt.The concentration of O2- at the scale/melt interface generated by the reduction of O2- and O22- tended to increase,which might promote the reaction of Fe2O3 grown on FeAl with Li2O, forming LiFeO2. The formation of LiFeO2 gave rise to a larger amss gain of FeAl,but provided a better protection to the alloy.With the formation of continuous external LiFeO2 and inner Al2O3 layer,the corrosion of FeAl was controlled by the transfer of the charged particles through the scale.Corresponding equivalent circuits were also proposed to fit the EIS of FeAl.

Keywords: FeAl (Li K) CO3 molten salt induced corrosion electrochemical impedance

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通讯作者: 王文

作者简介:

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