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论文

熔融Sn—S/ZnCl_2-NaCl体系界面脱硫反应动力学的阻抗分析

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摘要： 本文用交流阻抗方法研究了熔融Sn—S / ZnCl2-NaCl体系界面脱硫反应动力学过程，得到了该体系的阻抗响应图.通过用Randles等效电路，将所得的阻抗响应用非线性最小二乘法拟和，得到了Sn—S / ZnCl2-NaCl体系界面脱硫反应动力学的参数，溶液电阻Re,界面反应电荷传递电阻Rct，双电层电容Cd及界面脱硫反应的速率常数Kf.

关键词： 交流阻抗法 Randles等效电路 电荷传递电阻 双电层电容 渣金界面反应

THE IMPEDANCE ANALYSIS OF REACTION KINETICS AT THE INTERFACE OF MOLTEN Sn-S/ZnCl_2-NaCl SYSTEM

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Abstract: The interfacial desulphurization reaction kinetics between molten Sn-S alloy and ZnCl2-NaCl salt was studied by an AC impedance method and the impedance response of this system was given. By using Randles equivalent circuit, the kinetic factors on electrode reaction between the alloy and the salt were obtained, such as electrolyte resistance Re, double-layer capacitance Cd, charge transfer resistance Rct, rate constant of desulfurization reaction Kf and so on. When overpotential η equals to -85 mV, these values are Re=2.93×10-5 Ω.m2, Rct =2.47×10-5 Ω.m2, Cd=1.01 F/m2, Kf=2.1 × 10-3 s-1, respectively.

Keywords: AC impedance method Randles equivalent circuit charge-transfer resistance double-layer capacitance salt-metal interfacial reaction

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参考文献：

1蒋国昌,徐匡迪,邓健雄.金属学报,1990;26:B33(Jiang Guochang, Xu Kuangdi, Deng Jianxiong. Acta Metall Sin, 1990 26: B33)
2Xu C S, Tang X. ISIJ Int, 1992; 32: 1081
3焉毓璋,兰洪.金属学报,1991; 27:B224(Yan Yuzhang,Lan Hong.Acta Metall Sin,1991; 27:B224)
4 Ross Macdonald J.Applications of Impedance Spectroscopy Newyork:Wirey—Interscience Publication,1987
5Hino M, Nitta T, Chida S, Banya S Proc 3rd Int Conf on Molten Slags and Fluexs, London: The Inst Met,1988:286
6Gabrielli C.Identification of Electrochemical Processes by Frequency Response Analysis,Technical

Report Number 004/83;Solartron Instrument,A Division of Schlumberger Electroniocs (UK)Ltd.1984;2:157小野阳一,石飞精助,铁钢,1977;60:1533(Ono YOichi, Ishitobi Seisuke.Tetsu Hagane;1974 60: 1533)
8 Khodov N V; Alfortsev V M, Danilin L A. Tszetnaya Metaplugiya,1987 4: 113

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1. 王淑兰, 李光强, 隋智通 .含Ti高炉渣冷却及析晶过程中导率的变化[J]. 金属学报, 1999,35(5): 499-502