

能源和环境工程

168 kA新型阴极高效节能铝电解槽节能机理

王紫千, 姜艳丽, 冯乃祥

东北大学材料与冶金学院

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摘要

为了研究168 kA新型阴极铝电解槽的节能机理, 对新型阴极电解槽内部热场、电磁场以及铝液流场进行了数值模拟, 并利用自行研制的铝液波动动态检测系统对新型阴极电解槽阴极铝液液面波动进行了测量。结果表明: 新型阴极电解槽的阴极凸起可降低槽内阴极铝液的流速, 其阴极铝液X向、Y向水平流速均小于普通阴极电解槽, 并且能够有效地减弱阴极铝液的波动。因此, 新型阴极电解槽的极距为3.8 cm, 比同系列普通阴极电解槽低1 cm, 其电解质压降比普通阴极电解槽的电解质压降低380 mV。新型阴极电解槽能量利用率比同系列普通阴极电解槽能量利用率高5%。

关键词

[新型阴极](#) [节能](#) [铝电解槽](#) [铝液波动](#) [铝液流速](#)

分类号

Energy saving mechanism of 168 kA new type cathode aluminum reduction cell

WANG Ziqian,JIANG Yanli,FENG Naixiang

Abstract

For researching the energy saving mechanism of 168 kA new type cathode aluminum reduction cell, the thermal field, electromagnetic field, flow field of liquid metal were simulated and the surface oscillation of liquid metal in the new type cathode aluminum reduction cell was measured by a dynamic detecting system on the surface oscillation of liquid metal which was designed by the authors. The results showed that the cathode convex in the new type cathode aluminum reduction cell could reduce the velocity of liquid metal and could weaken the surface oscillation of liquid metal. The X velocity and Y velocity of liquid metal in the new type cathode aluminum reduction cell were lower than that in the traditional cathode aluminum reduction cell. The polar distance of the new type cathode aluminum reduction cell was 3.8 cm. It was 1cm lower than that of the traditional cathode aluminum reduction cell. The voltage drop of electrolyte in the new type cathode aluminum reduction cell was 380 mV lower than the voltage drop of electrolyte in the traditional cathode aluminum reduction cell. The energy utilization of the new type cathode aluminum reduction cell was 5% greater than the energy utilization of the traditional cathode aluminum reduction cell.

Key words

[new type cathode](#) [energy saving](#) [aluminum reduction cell](#) [surface oscillation of liquid metal](#) [velocity of liquid metal](#)

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