## **Accepted Manuscript**

Title: Application of solid electrochemical sulfur sensor in the liquid iron

Authors: Tianpeng Wen, Jingkun Yu, Endong Jin, Tao Liu, Xinghui Hou, Qiaoyang Sun

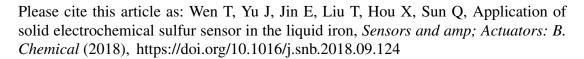
PII: S0925-4005(18)31760-X

DOI: https://doi.org/10.1016/j.snb.2018.09.124

Reference: SNB 25430

To appear in: Sensors and Actuators B

Received date: 13-4-2018 Revised date: 12-9-2018 Accepted date: 29-9-2018



This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



## ACCEPTED MANUSCRIPT

Application of solid electrochemical sulfur sensor in the liquid iron

Tianpeng Wen, Jingkun Yu\*, Endong Jin, Tao Liu, Xinghui Hou, Qiaoyang Sun

School of Metallurgy, Northeastern University, Shenyang 110819, China\

\* Corresponding author.

*E-mail address*: yujk@smm.neu.edu.cn.

Highlights

• A novel sulfur sensor was designed based on ZrO<sub>2</sub>(MgO) as solid electrolyte

and CaAl<sub>2</sub>O<sub>4</sub>+CaAl<sub>4</sub>O<sub>7</sub> as electrode coating.

• In situ formation of CaAl<sub>2</sub>O<sub>4</sub>+CaAl<sub>4</sub>O<sub>7</sub>+CaS+Al<sub>2</sub>O<sub>3</sub> auxiliary electrode

• Fast response time and small measurement errors.

• Application well in the liquid iron.

Abstract

A novel solid electrochemical sulfur sensor based on ZrO<sub>2</sub>(MgO) as solid electrolyte and

CaAl<sub>2</sub>O<sub>4</sub>+CaAl<sub>4</sub>O<sub>7</sub> as electrode coating was developed and tested in the carbon-saturated liquid iron

at 1773 K. A mixture of chromium and chromium oxide was used as the reference electrode, CaS

was allowed to synthesized in situ during the measurement by the CaAl<sub>2</sub>O<sub>4</sub>+CaAl<sub>4</sub>O<sub>7</sub> coating on the

surface of ZrO<sub>2</sub>(MgO) solid electrolyte to form the auxiliary electrode with residual CaAl<sub>2</sub>O<sub>4</sub> and

CaAl<sub>4</sub>O<sub>7</sub> phase based on the reactions: CaAl<sub>2</sub>O<sub>4</sub>+[S]=CaS+Al<sub>2</sub>O<sub>3</sub>+[O] and

1

## Download English Version:

## https://daneshyari.com/en/article/11016359

Download Persian Version:

https://daneshyari.com/article/11016359

<u>Daneshyari.com</u>