

## Measurement of Oxygen Potential of Stainless Steel Slags with a Pt Electrode-Based Sensor Prepared by MOCVD

Víctor Arredondo-Torres, Antonio Romero-Serrano\*, Roberto Vargas-García,  
Beatriz Zeifert, José Hallen-López and Mayra Figueroa-Torres<sup>1</sup>

Metallurgy and Materials Department, IPN-ESIQIE, A. P. 118-431, Mexico D.F. 07051

<sup>1</sup>Chemical and Materials Department, CIMA.

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A sensor employing yttria-stabilized zirconia (YSZ) was used to determine the oxygen potential of slags based on the  $\text{CaO-SiO}_2\text{-CaF}_2\text{-CrO}_x\text{-Al}_2\text{O}_3$  system at 1723 K. The YSZ sensors were coated with Pt electrode films deposited by metal-organic chemical vapor deposition (MOCVD) to increase the conductivity of the measuring devices and to decrease their response time. The oxygen potential of the slags was related to the  $a_{\text{CrO}}/a_{\text{CrO}_{1.5}}$  ratio through the Nernst equation and the free energy of the equilibrium reaction between CrO and  $\text{Cr}_2\text{O}_3$ . Good agreement was obtained between the measured values and the theoretically calculated results. The order of magnitude of  $a_{\text{CrO}}/a_{\text{CrO}_{1.5}}$  was too low, between 0.0005 and 0.005, owing mainly to the high oxidation conditions that prevail in an open induction furnace. It was also found that  $a_{\text{CrO}}/a_{\text{CrO}_{1.5}}$  slightly decreases with an increase in the amount of  $\text{Al}_2\text{O}_3$  in the system.

\*Corresponding author, e-mail address: romeroipn@hotmail.com