

(293) Effect of MgO and Al₂O₃ on the Sulphide Capacity of CaO-CaF₂-SiO₂ Fluxes

°K.Susaki*, M.Maeda** and N.Sano***

(*) Department of Metallurgy, University of Tokyo (On leave of absence from COSIPA - Brazil)

(**) Institute of Industrial Science, University of Tokyo

(***) Faculty of Engineering, University of Tokyo

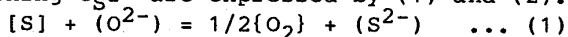
1. Introduction

Hot metal pretreatment is usually carried out in ladles or torpedo cars lined with alumina-based or magnesia-based refractories. Furthermore, in practical operation it is very common that some amount of blast furnace slag remains in the vessel even after slag-off operation. Therefore in industrial processes some degree of contamination of added fluxes for pretreatment is unavoidable. In the previous work⁽¹⁾, the sulphide capacity (C_{S2-}) of CaO-CaF₂-SiO₂ ternary fluxes were determined at temperatures ranging from 1200 to 1350°C showing that lime saturated compositions have outstanding desulphurization capabilities.

In this work the influences of MgO and Al₂O₃ on the sulphide capacity of CaO-CaF₂-SiO₂ fluxes were investigated.

2. Experimental procedure

The method employed is the same as the previous work namely flux and molten silver were equilibrated under controlled atmosphere. The fundamental reaction and the equation for determining C_{S2-} are expressed by (1) and (2).



$$C_{S2-} = K \cdot p_{O_2}^{1/2} \cdot \%(S^{2-}) / \%[S] \quad \dots (2)$$

3. Results

Figure 1 shows the influence of partial substitution of CaO by MgO on C_{S2-} of the CaO-CaF₂-SiO₂ ternary flux (%MgO+%CaO=56). It is confirmed that MgO is weaker desulphurizer than CaO but its effect depends on the flux composition, especially on CaO/SiO₂ ratio. This can be seen by comparing Figure 1 with Figure 2 (flux with %MgO+%CaO=64). As can be seen C_{S2-} decreases with increasing MgO content and this is more pronounced at higher CaO-SiO₂ ratio.

The influence of Al₂O₃ on C_{S2-} of the same flux system is presented in Figure 3 indicating that C_{S2-} increases when silica is partially replaced by alumina (%Al₂O₃+%SiO₂=14). It can be concluded that with highly basic fluxes such as those investigated here Al₂O₃ is nearly as acidic as SiO₂.

REFERENCE

- 1) K.Susaki et al: Tetsu-to-Hagane, 73 (1987), S244

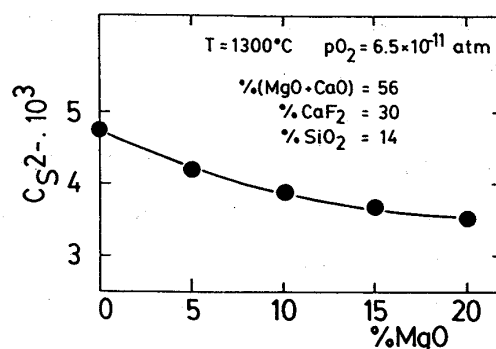


Fig.1 Influence of MgO on sulphide capacity of CaO-CaF₂-SiO₂ flux (%CaO+%MgO = 56)

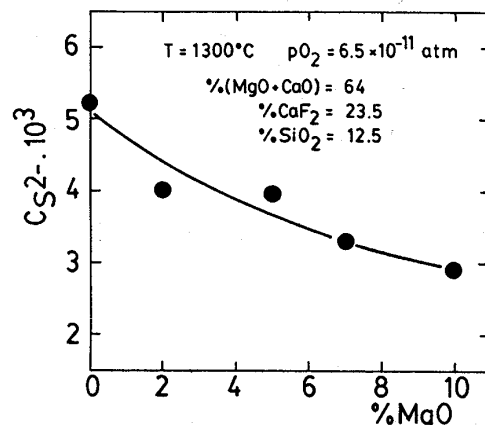


Fig.2 Effect of MgO on sulphide capacity of CaO-CaF₂-SiO₂ flux (%CaO+%MgO = 64)

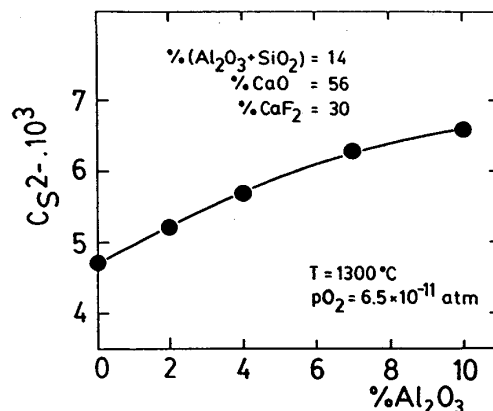


Fig.3 Influence of Al₂O₃ on sulphide capacity of CaO-CaF₂-SiO₂ flux