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1. Introduction

In recent years, many researches on the pretreatment of hot metal from various viewpoints were published (1,2,3), but only a few studies (3,4) were performed on the manganese distribution between carbon-saturated iron melts and lime-based fluxes.

The present authors previously investigated phosphorus distribution equilibrium between carbon-saturated iron with manganese content of 5.5-6.5% and lime based-fluxes in the temperature range from 1250°C to 1350°C.

The purpose of the present work is to obtain the equilibrium manganese distribution for the same system and investigate the effect of Na₂O, BaO addition at 1300°C.

2. Experimental methods

Two grams of carbon-saturated iron which contains 5.5% manganese were equilibrated with two grams of slags containing 1.0-3.0 MnO, 11.5% SiO₂, 30.0% CaF₂ and 50.0-58.0% of CaO. To determine the effect of Na₂O and BaO on the manganese distribution, 0.1 to 2.6% of Na₂O was added to the CaO-CaF₂-SiO₂-MnO system or, CaO was replaced by BaO up to 8.3%.

3. Experimental results

Fig.1 shows the relation between equilibrium manganese distribution and basicity index, defined as CaO/SiO₂ wt%/wt% for the CaO-CaF₂-SiO₂-MnO system at 1300°C with P_{CO}=1atm, Q_c=1 and CaF₂ 30.0%. As can be expected, the equilibrium manganese distribution decreases with increasing index of basicity.

Fig.2 shows the effect of Na₂O addition at 1300°C to the CaO-CaF₂-SiO₂-MnO system. The equilibrium manganese distribution slightly decreases with increasing Na₂O content. The same behaviour of the manganese partition was observed in the case of replacement of CaO by BaO. This indicates that the manganese equilibrium distribution follows the general trend of basic slag systems.

4. Conclusions

The equilibrium manganese distribution ratio between carbon-saturated iron and lime-based fluxes containing MnO, BaO, Na₂O oxides decreases with increasing the index of basicity CaO/SiO₂ (wt%/wt%) as well as with increasing the content of BaO and Na₂O.

References

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3. F. Tsukihashi et al.:Tetsu-to-Hagane, 69 (1983) 5945
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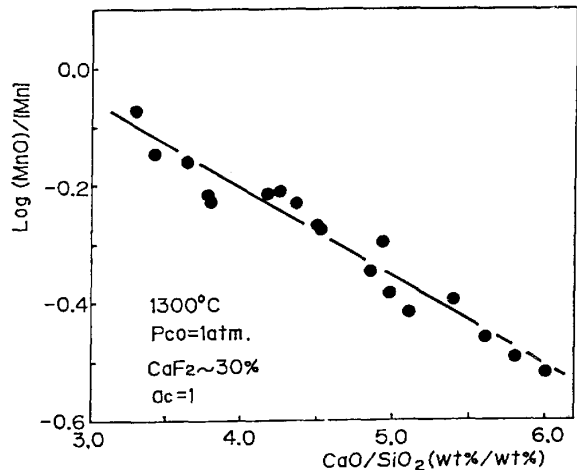


Fig. 1. Relation between distribution of manganese and CaO/SiO₂ (wt%/wt%) for the CaO-CaF₂-SiO₂-MnO system.

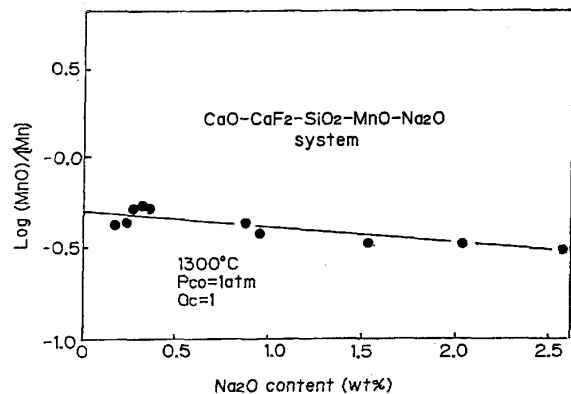


Fig. 2. Relation between distribution of manganese and Na₂O content (wt%) for the CaO-CaF₂-SiO₂-MnO-Na₂O system.