'80—S 702

546.46-31: 622.341.1-185: 536.5

(102) Effect of MgO to melting temperatures and amount of primary slag in basic sinter

TH AACHEN K. KREIBICH ×1)

H. W. GUDENAU and. NOMIYA, YAWATA Works NSC

I. Introduction; Possibilities have been investigated in the laboratory for improving gas permeation in the coke slit area of the cohesive zone in the blast furnace. Especially the role of FeO in primary slag (PS) and its influence to melting temperatures and amount of PS was investigated

II. Testing method; For this purpose a electronic balance was used, which allows to determine simultaneously reduction degrees, melting intervals between PS and iron phase melt (IM) amount of melt and also the quantitative chemical composition of the respective trickling melting phase. A time-temperature-gas-program was selected to get final reduction degrees in the range of 70% which is considered to be the range in BF'S cohesive zone. The soft, and melting properties of basic sinter (MgO and CaO) and selecled pellets were investigaited.

III. Results; Fig 1 shows the change of the characteristic temperatures as a function of the MgO-content in sinter according to a starting basicity of CaO/SiO_2=1.5-1.6. It becomes obvious that an increase of MgO-content in the agglomerates takes place simultoneously with a shifting of melting temperatures Ts (PS) and T_{SE} (IM) to higher temperatures. Fig2 shows the relation of the theoretical substitution ratio to the actually determined substitution ratio for the MgO-content in PS and IM-phases.

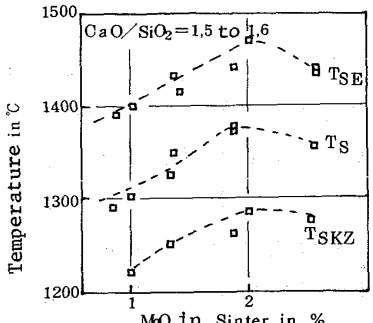

Fig. 1. MgO influence to soft. melt. temperatures (T_S=PS)

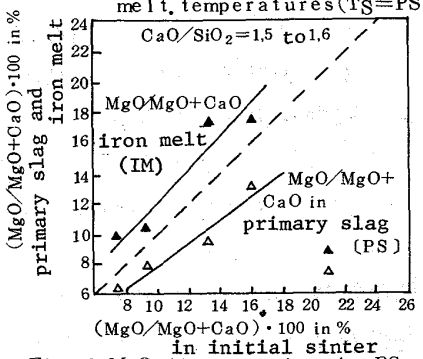

Fig. 2. MgO distribution in PS and iron melt (IM)

Sinter	
Amount of PS in % of total melt	MgO/MgO+CaO x100 in %
35-25	5
25-10	5-11
10	12-21
Pellets	
40-45	

Fig. 3. Relation between substitution ratio and amount of PS in sinter

The dissolution of MgO in IM is stronger than in PS. Fig3 shows that the amount of PS decreases with increasing MgO/MgO+CaO content in sinter. Fig4 shows the FeO-contents in PS of agglomerates with different MgO/MgO+CaO contents. It is evident, that with const CaO/SiO_2 ratio and increasing MgO/MgO+CaO ratio in sinter FeO contents of PS are decreasing.

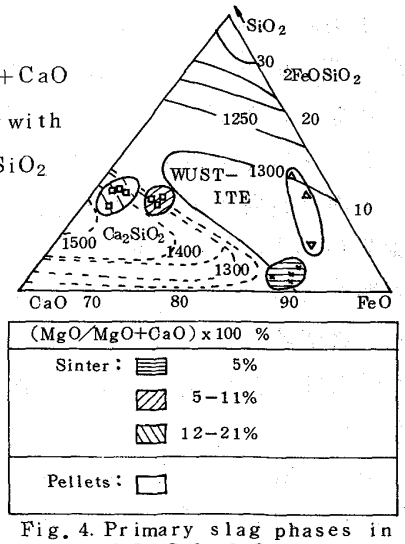

Fig. 4. Primary slag phases in FeO-CaO-SiO_2 system

IV. Conclusion; MgO stabilizes the remaining and slag surraunding FeO phases in sinter after reduction. By that, a solution of slag and FeO is hindered. The FeO content in PS and the amount of PS decrease. With lower FeO content and constant total basicity the melting temperature of PS increases. Both, lower amount and higher melting temperature, improve the permeability of the coke slit area, respectively of the cohesive zone in the blast furnace.

×1) Now: Tokyo Inst. of Technlogy, Dept of Metallurgy