

## 16. Influence of Slag, especially of $Al_2O_3$ and $TiO_2$ in Slag upon the Structure and Mechanical Properties of Cast Iron. (II)

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We are studying fundamentally in detail the phenomenon found by Mr. Kerpely, and H. Sawamura, etc. independently, which produces a fine graphite carbon cast iron from flaky graphite carbon cast iron when it is melted under  $SiO_2$ - $CaO$ - $Al_2O_3$  system--or  $SiO_2$ - $CaO$ - $Al_2O_3$ - $TiO_2$  system--slag. The first work of this experiment was already reported in Series No. 19, Kaken Keenshu, 1949.

In the present report, experimental results are given on the influence of the melting temperature, regarding the chemical components and constitution in cast iron-slag reaction.

Sample:

Cast iron: C%	Si%	Al%	Ti%	N% in HCl soluble soln.	N% in HCl insoluble soln.	Total N%
3.77	2.81	0.33	0.75	0.0036	0.0051	0.0087
Slag: $SiO_2$ %	$CaO$ %	$Al_2O_3$ %	Basicity			
36.60	56.19	8.38	1.5			

Experimental Conditions:

Melting pt. ....1,400° and 1,450°C.

Atmosphere .....air

Cast iron: Slag.....5:1

Reaction vessel .....carbon crucible

Melting duration of time...15, 30 and 60 minutes at each temperature

Results:

We found no considerable change of C, Si and Al contents in the sample, Ti content decreased to 0.55-0.60% in 15 minutes from the original 0.75%, while no appreciable change was observed either in 30 minutes or 60 minutes.

Nitrogen in the main solution (we mean the HCl soln. of the cast iron had as similar behavior as Ti, as given below;

Melting temp.	Duration of time	N% in the main solution
	original	0.0036
1400°C	15 min.	0.0016
	30	0.0015
	60	0.0009
1450°C	15 min.	0.0028
	30	0.0015
	60	0.0010

We find in these experiments the flaky graphite carbon, becomes finer in compliance with the above mentioned chemical phenomena.