A) GAKUSHIN method ($HClO_4$–H_2SO_4)

B) H. Kempf's method (K_2SO_4–H_2SO_4–$CuSO_4$)

We recognized the influence of the carbonization of filter paper on the decomposition of the residue, as in Table II.*

Results; Table 2.

Table 2

Decomp. Time (min.)		55	10	15	30	60	120	120*
Decomp. method	$HClO_4$-H_2So_4	1.97	39.47	30.26	40.79	57.89	57.89	89.47*
	K_2SO_4-H_2SO_4 -$CuSO_4$	11.05	19.47	19.47	77.37	53.95	63.16	100.00*

We found that the separation of the HCl insoluble residue by means of asbestos gives a very good result concerning the extraction of Ti contained in the residue in decomposition procedure.

Thus H. Kemph's method is supposed to be better than "Gakushin" method.

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58. Influence of Slag especially of Al_2O_3 and TiO_2 in Slag upon the Structure and Mechanical Properties of Cast Iron. (III)

Hiroshi Sawamura and *Masatoshi Tsuda.*

(Sawamura Laboratory)

In this report, the behavior of combined nitrogen in the gray cast iron is given, when the cast iron is remelted at 1400°C in air atmosphere.

The melting duration of time are 15, 30 and 60 minutes at 1400°C respectively. The sample is removed from the first furnace to the second previously heated at 500°C together with the carbon crucible, after kept at 1400°C for a certain duration of time, and coold to room temperature in the second furnace. The following table shows the results obtained.

Exp. No.	Melting temp. °C.	Melting duration of time min.	N% in HCl soluble solution	N% in HCl insoluble residue	Total N%
original	—	—	0.0033	0.0081	0.0114
D-3-4	1400	15	0.0038	0.0085	0.0123
D-3-5	1400	30	0.0037	0.0110	0.0147
D-3-6	1400	60	0.0038	0.0128	0.0166
D-3-7*	1400	60	0.0037	0.0087	0.0118

Combined nitrogen contained in the cast iron, especially nitrogen in HCl insoluble residue was found to increase conspicuously after 15 minute melting. To clarify this phenomenom, sample No. D–3–7 was treated according to the following conditions.

Melting temp. ..... 1400°C
Melting duration of time ..... 60 min.
Atmosphere ..... air
Cooling ..... the sample is cooled to 1100°C. from 1400°C. in the first melting furnace, then quenched in water.

Those results show that the quantity of the combined nitrogen in the cast iron is as similar as in the original sample.

From the above mentioned results, we found that the cooling conditions likely affects some behaviors of combined nitrogen.

We admitted that the flaky grafite carbons in the cast iron became finer according to the chemical phenomena above mentioned.

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59. Influence of Slag especially of Al_2O_3 and TiO_2 in Slag upon the Structure and Mechanical Properties ofCast Iron. (IV)

Hiroshi Sawamura and *Masatoshi Tsuda*

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The gray cast iron was melted under SiO_2–CaO–Al_2O_3 or SiO_2–CaO–$Al_2O_3TiO_2$ system slag at 1400°C., and cooled in various ways respectively as follows:

a): quenched in water.

b): cooled in air.

c): cooled to room temperature from 500°C in furnace.

d): cooled to room temperature from 1400°C in furnace.

Melting duration of time were 60 minutes at 1400°C.

Table 1. Chemical component of cast iron

C %	Si %	Mn %	P %	S %	Al %	Ti %
3.37	2.21	0.58	0.26	0.071	0.14	0.04

Table 2. Chemical composition of artificial slag.

Slag No.	SiO_2 %	CaO %	Al_2O_3 %	TiO_2 %	Total Fe %	Basicity
S-3′	41.36	44.60	8.52	0.14	1.35	1.08
S-4	34.02	49.86	8.34	8.35	—	1.46