

\* , , ( )

# 1.

가

가

# 2.

## 2.1

< 1>

Cu-slag,

Ig-loss

가

가

가

XRD, DTA

< 1>, < 2>

XRD

fresh

가

CaCO<sub>3</sub>

Ca(OH)<sub>2</sub>

가

DTA

450

Ca(OH)<sub>2</sub>

peak

750

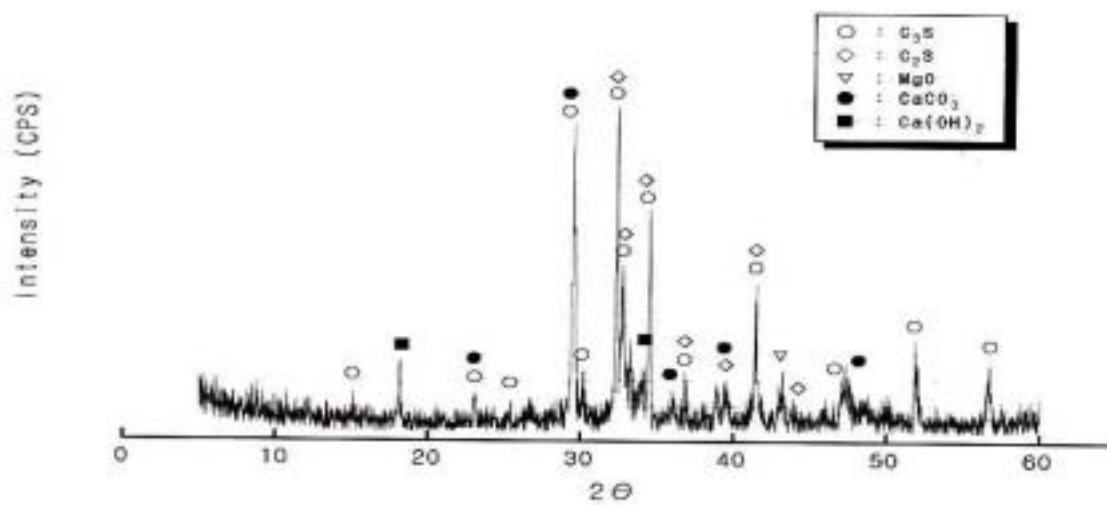
CaCO<sub>3</sub>

peak

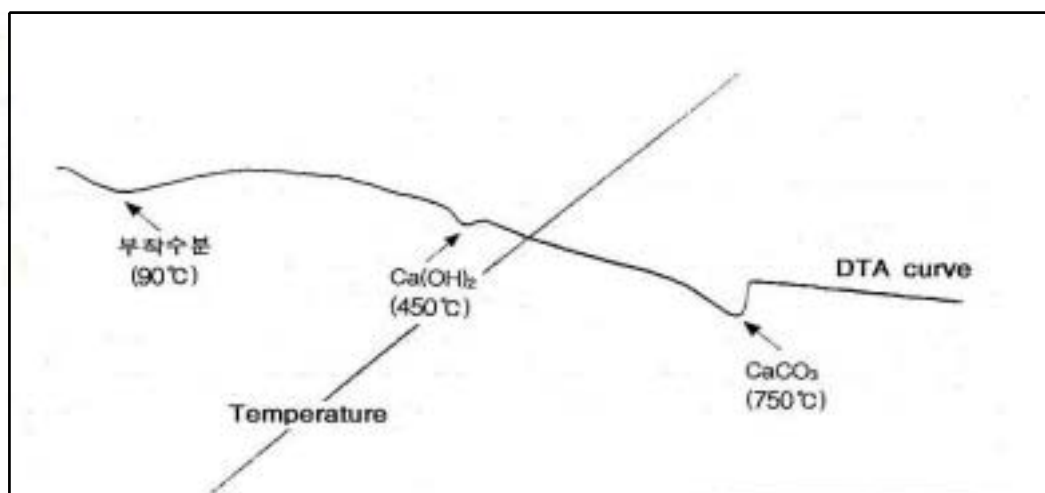
가

1.

-	lg-loss	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	CaO	MgO	SO <sub>3</sub>
	38.87	7.42	2.45	1.40	47.13	2.44	0.10
	3.94	62.36	20.28	8.12	2.38	0.24	0.05
	0.63	92.50	3.60	1.80	0.85	0.12	0.08
Cu-slag		37.76	6.98	49.52	6.97	0.49	0.10
	8.9	19.7	4.6	3.0	58.4	3.32	0.05



1. XRD Pattern



2. DTA Curve

KS

HGI < 2>  
46 55  
가 .

2. HGI

3.

	<b>Fresh</b>	
HGI	46 55	38.74

3.1 Raw Mix

< 3>  
가 가 , Cu-slag

2.2

가

10%, 20%, 40%, < 4>

Raw Mix

60%

ball mill 13%

. < 4>

, Target Modulus

가

LSF 91.0, SM 2.50, IM 1.60

가 , 13%

Raw Mix

가 f-CaO

100 24 , 1450 30

가

1450 10 f-

CaO

3.

( : %)

2.3 Raw Mix

	Ref.	(10%)	(20%)	(40%)	(60%)
	91.22	82.21	73.21	55.20	37.19
	6.56	5.57	4.58	2.59	0.61
	0.13	0.28	0.42	0.71	0.99
Cu-slag	2.09	1.94	1.79	1.50	1.21
Clinker*	0	10	20	40	60

) \* :

2.4

4. Raw Mix 90 μm

( : %)

XRD

	Ref.	(10%)	(20%)	(40%)	(60%)
*	13.2	13.3	17.5	20.2	23.0
f-CaO**	5.22	3.63	2.67	1.79	1.32

) \* : (rpm : 50, 550 )

2.5

5%

\*\* : ( : 13%)

가

3.2

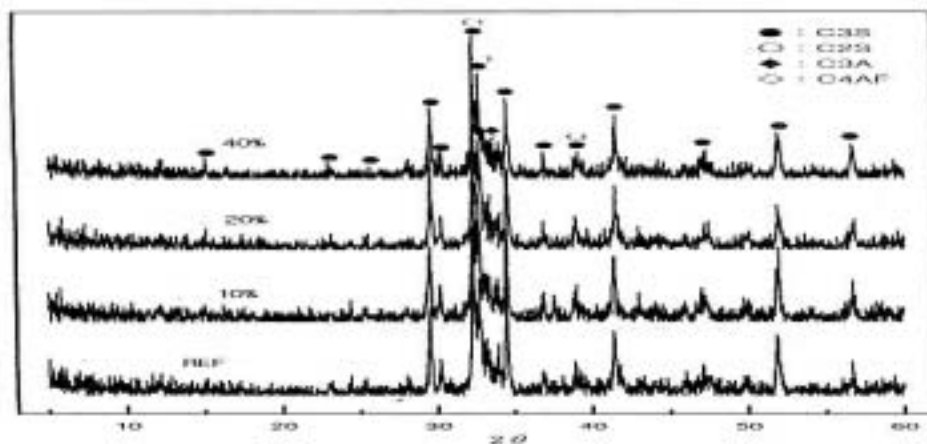
size, 60%

< 5>  
 가 가 MgO 가  
 가 MgO 가  
 MgO 가  
 , f-CaO 가  
 가  
 XRD peak  
 가 10%, 20%  
 ref.

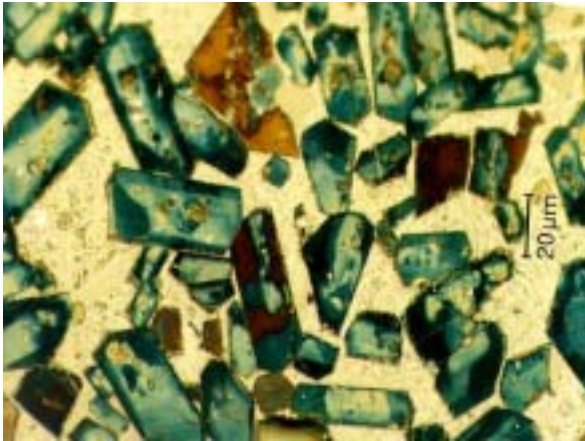
5.

( :%)

	LOI	SiO2	Al2O3	Fe2O3	CaO	MgO	SO3	Total	f-CaO
Ref.	0.60	22.13	5.54	3.37	64.00	2.84	0.04	98.52	1.15
10%	0.50	22.16	5.47	3.45	63.87	2.93	0.04	98.42	0.95
20%	0.45	22.17	5.46	3.51	63.87	2.93	0.04	98.43	0.68
40%	0.53	22.16	5.52	3.41	63.33	3.12	0.05	98.12	0.44
60%	0.53	22.20	5.50	3.45	63.33	3.31	0.05	98.37	0.51

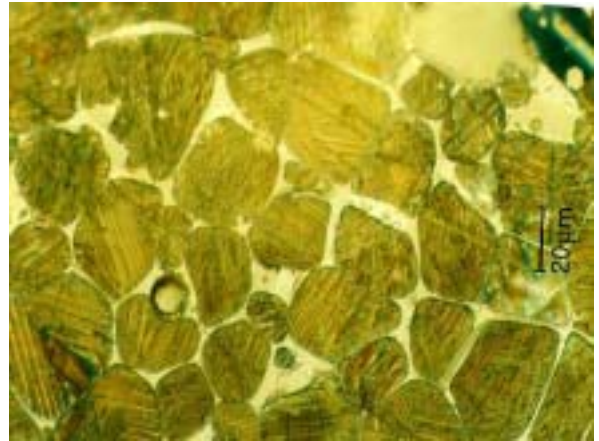


3. XRD Patterns

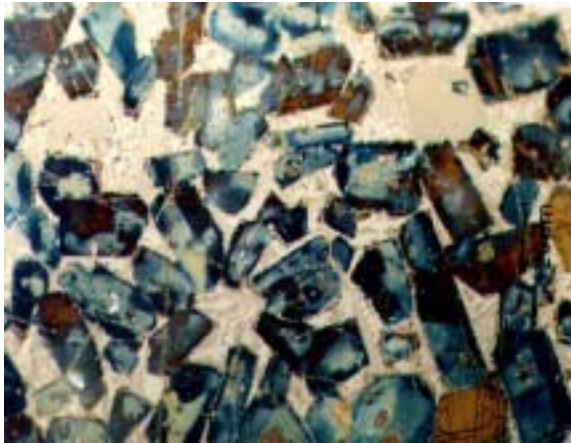


alite

a) ref.



belite

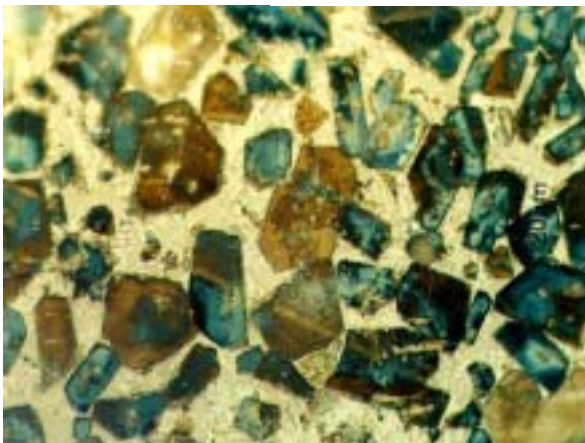


alite

b) 10% 가

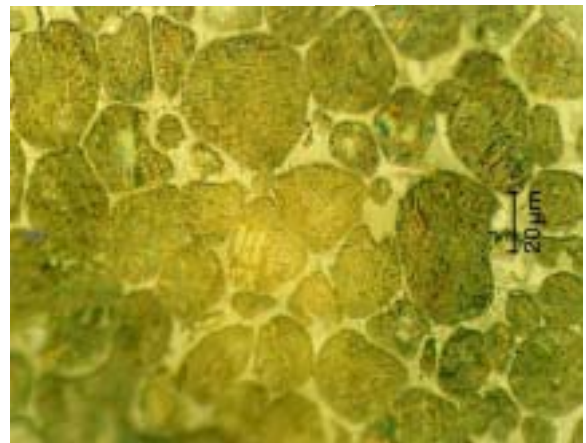


belite

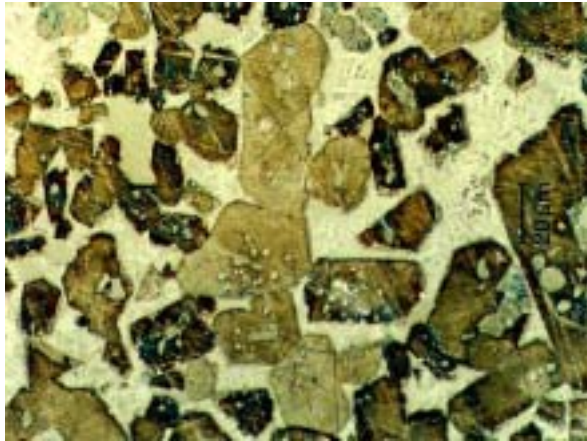


alite

c) 20% 가

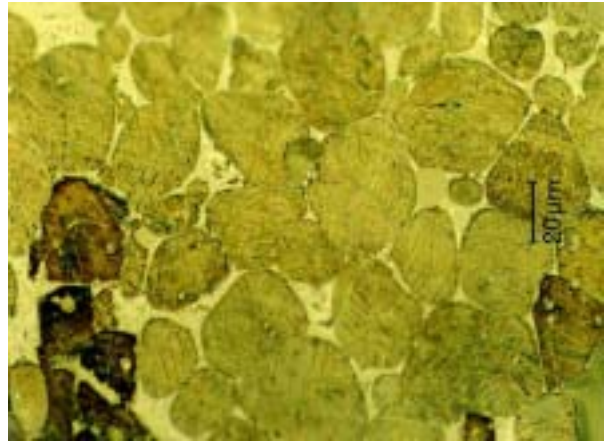


belite

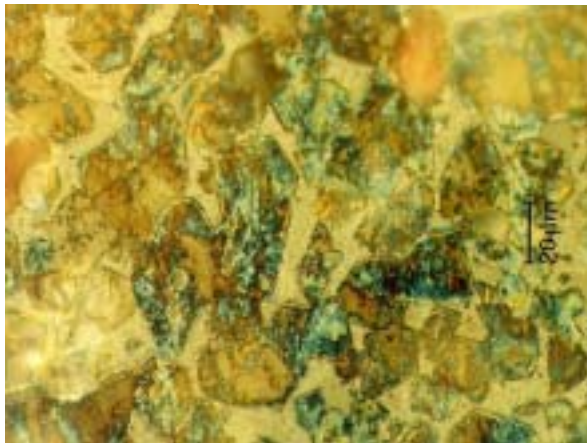


alite

d) 40% 가

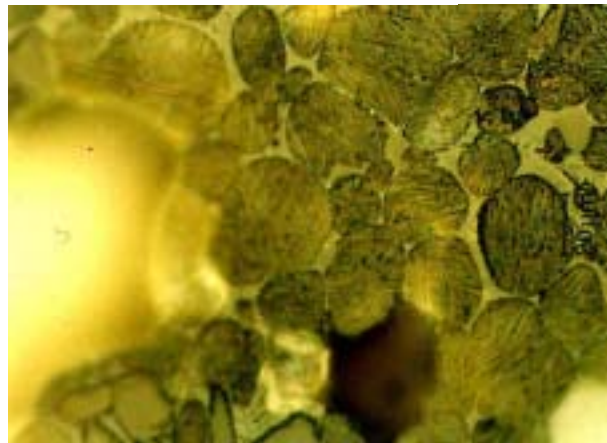


belite



alite

e) 60% 가



belite

4.

< 4 >

가 가  
가 ,

CaO

ref.

< 6 >

6.

Ref.	- -
10%	-, ref size
20%	-, size ref
40%	-, 가
60%	- - 가

3.3 . 10, 20%  
 < 7>, < 8> ref. 10 20 , 60%  
 가  
 가 가 MgO 가 , 가 가 가  
 f-CaO  
 가  
 60% 가 . 7 28  
 가 가 .

7.

	Blaine (cm <sup>2</sup> /g)	(%)		(%)			(%)	Flow (mm)	(kg/cm <sup>2</sup> )		
		45 μm	90 μm		(min)	(h:m)			3	7	28
Ref.	3268	16.4	2.2	23.1	265	7:00	0.13	183	196	349	443
10%	3184	20.0	2.2	22.9	245	6:45	0.12	184	197	350	464
20%	3309	19.7	2.0	22.6	255	6:55	0.12	184	207	344	456
40%	3232	18.4	2.0	22.8	270	7:40	0.09	183	215	354	479
60%	3364	16.8	1.8	24.0	300	8:30	0.05	180	225	352	471

8.

		5	10	20	30	40
Ref.	34.0	33.2	30.1	23.0	18.8	15.5
10%	34.8	33.4	25.0	17.5	15.0	11.0
20%	36.0	35.0	33.0	27.0	20.0	16.0
40%	34.0	32.8	30.0	25.0	17.0	14.4
60%	33.5	30.2	25.0	15.0	8.0	8.0

9.

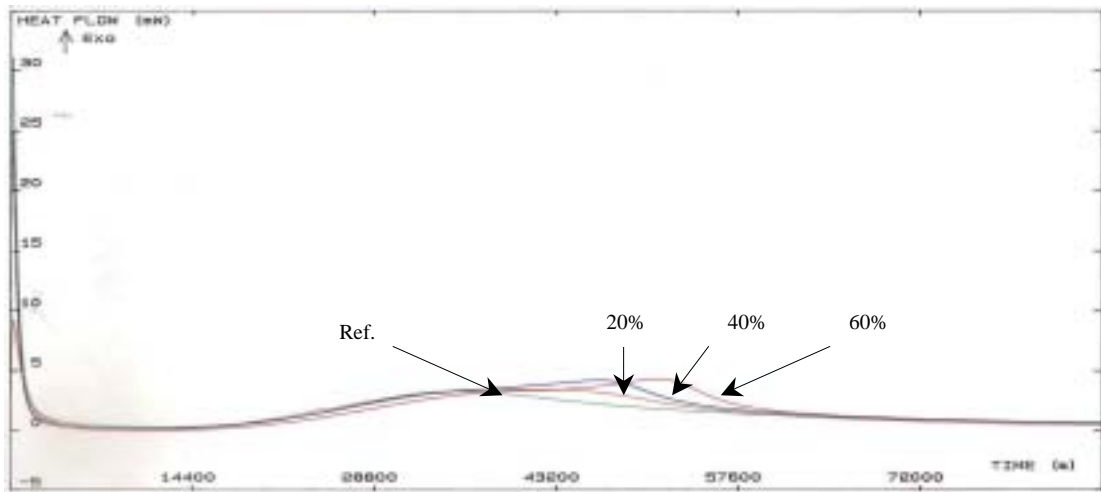
< 9> < 5>

( : cal/g)

	Ref.	20%	40%	60%
6	7.3	4.3	5.6	4.5
24	33.3	32.9	37.4	36.7

ref.가 가

, 24 가  
 가 가 .



5.

< 5> curve  
 $C_3A$  f-CaO  
 1 peak 가 가  
 modulus  $C_3A$   
 f-CaO 가  
 $C_3S$   
 2peak 가 가  
 가 가  
 size , 가 가  
 가

4.

1) 가 가 ,  
 $Cu-slag$   
 가  
 가 fresh  
 2) 가  
 가  
 3) 10%,  
 20% 가 ref.  
 , 60% 가  
 가  
 4) 3 가 가 , 7 28  
 가