

(19)
(12)

(KR)
(A)

(51) 。 Int. Cl. ⁷
C09C 1/56

(11)
(43)

2002 - 0037532
2002 05 22

(21)
(22)

10 - 2000 - 0067490
2000 11 14

(71)

()

300

(72)

971 - 1105 - 1701

723

4843301 - 504

2 991 - 9

236

258 - 9

(74)

:

(54)

가

,

,

,

,

0.0199%

,

100%

1

1.

2

•
,

3

4

5

6

7

8

가

가

가

가

가
가

가 .

```
(ash)
```

가 , 가

가

가

가

1

80%

가

0.5 1.0% (: 0.3 0.6%) 0.1 0.5%
pH 4.30 5.50

2

2a 1,000

2b 2c

가

[1]

		(%)	(%)			pH
			0.5 1.0	0.3 0.6	0.1 0.5	
	1 5 μ m	80				4.30 5.50

(ball mill),

(attrition mill)

가 1 5 %가

5 30

가

, - 275 95%

15 μ m

(flotation)

([Wan - Tae Kim, Sung - Oh Lee, Nam - Pyo Kook and Bang - Sup Shin, The Removal of Unburned Carbon from Coal Fly Ash by Flotation, Resources Processing of Japan, Vol.45., No.1 (1998)]).

(Aero Promoter) 710 845(CYANAMID Co.)

(Kerosene(), KANTO, Chem. Co. INC)

(Aero Froth) 73(CYANAMID Co.), MIBC(CYANAMID Co.)

Pine Oil, The Nippon Koryo Yakuhin Co., L.T.D)

가

AF73

1.0kg/t

6.5kg/t

1.0kg/t

6.5kg/t,

4.5kg/t

6.0kg

/t

, AF 73

. AF 73 5.5

6.5kg/t

가 , pH

가

(Na(PO₄)₆)

0.1

5.0kg/t

가

kg/t

가

가

0.1 3.5kg/t

, 3.5

가

가

1 10 l

/ ,

1

8 l /

(

1

). 10 l /

가

0kHz)

0 1,200W

, 5 30

(125cmHx25cmW)

(: Ultra - sony gener hor - 1000(4

가

가

가

가

가 가

가

(magnetic separation)

가

1

5.5%

. 1%

가

5.5%

가

가

000 18,000 가

(gauss)

(Boxmag Co.)

3,

(Boxmag Co.)

3,000

18,000가

, 5,000 가

90%

, 7,000 가

/

1 5 가 ,

0.01 99% , 100%
60% ,

700m²/g 900m²/g

ICPA(Inductively Coupled Plasma Analyzer, JOBIN - YVON Co.)
(TG/DTA, Thermoflex type, Mac Science Co.), (Poresimeter, Q
UNTACHROME Autosorb - 1/#02019 - PC, Quantach - rome Co.), SEM/EDX (Scanning Electron Micros
copy, JSM - 5400, JEOL Co.) (Poresize Analyzer, Ms1002, Malvern Ins.)

1 5

6

1:

가 , 1

3 350 450
182 , 300

(: $\Delta T(\mu W)$, 가 :).
가

(crude particles)
, ICPA SEM/EDX Fe, V, Ca, Na, Mg, Si

2 1

가 가

5 % 가
99%가 - 400

41.50% , 1% +400 가 58.50% 99%가 - 400

[2]

	(100 , 24hr)		(6%)	
	(wt.%)	(wt.%)	(wt.%)	(wt.%)
+4	28.16	27.45	-	-
- 4/+8	19.30	20.22	-	-
- 8/+20	29.8	31.35	-	-
- 20/+50	19.25	17.24	-	-
- 50/+100	3.03	1.88	-	-
- 100/+200	0.29	1.85	-	-
- 200/+400	0.073	0.01	0.78	58.50
- 400	-	-	99.22	41.50
	99.90	100	100	100

2 ℓ , 1
 1, 2, 3, 4, 5 6% (L/S)가 , 500rpm 2
 4
 4 4% (carbon plug)
 2 90%가 가 5%
 가
 4%
 2:

, (Φ30x50h, (ceramic mill),), (Attrition Mill, KMD - 1B, ()), (Φ40x1050h, 1 - 800rpm,), ((Ultra - soni
 ny generator - 1000(40kHz), 1 - 1200W,)

30%(, Φ30mm:25%, 20mm:30%, 10mm:30%, 5mm: 15%)
 가 1 5%
 Φ20Wx25h (, Φ8mm:50%, Φ6mm:50%) 30% ,
 가 1 5% (Φ4
 0x1050h, 1 - 800rpm)

1 1 5%
 15 275 ,
 3 3

[3]

	(%) (275)
+	70%
	10
	95
	90
	60

3 , (BM) (AM) 90% 가

(rpm 350) 600W 60% 70% 10% 2 -

4% 3:

2 (rpm: 350) (600W) 15 3%

(Aero Froth) 73, MIBC , (Pine Oil) 4.5kg/t 1 7 kg/t 가 , 가

5 , AF 73 가 , 5.5 6.5kg/t 90%

(Na(PO₄)₆) 0.1 5.0kg/t 가 가 가

가 , 8 ℓ / ,

6 pH AF 73 가 , pH

4:

3% 4

250rpm 30

[4]

	200W		600W		1,200W	
	(wt.%)	(wt.%)	(wt.%)	(wt.%)	(wt.%)	(wt.%)
10	6.50	0.32	4.86	0.50	4.34	0.59
20	5.25	0.39	3.58	0.66	2.85	0.65

4 가 , 가
가 , 가
600W 20 가
5 가
가 5% 가
4

[5]

	1%	2%	3%	4%	5%
	60cp	228cp	336cp	2400cp	12,000cp

5:

2 (350rpm) ((Ultra - sony gener hor - 1000(40kHz), 600W,)
3.5% (Boxmag Co.))

Fe Fe₂O₃ , FeS₂가 Fe S가
FeS₂

7 5,000 가 (gauss) 90%
, 7,000 가 . XRD EDX Fe ,

8 7,000 가
4% 가 , 4% 가
가 가 4%

6

6 1 5 , 1 ,
(mini - pilot) , 2
6

1 3% 가 , 2
(600W) 15

73 6.0kg/t 3 가 4.5kg/t (Aero Froth)

4 (600W, 20) 가 3%가 ,
 4 가 1
 4
 5 ((Boxmag Co.), 7,000 가)
 24 () , 100
 6 6 , 1 2
 1 2
 (KS)
 (350)
 ,
 , pH
 pH 6.05 350 , 100
 0.340%

[6]

	1	2	A	B
(mg/g)	700.0	745.0	50.0	862.5
() (m ² /g)	930.3	905.5	43.7	947.7
D.B.P.(cm ³ /100g)((n -))	330.0	350.0	162.1	326.2
C.D.B.P.(cm ³ /100g)((n -))	-	-	90.8	-
(% vs. IRB#3)	105.1	110.5	49.5	113.1
(%, 425nm)	99.8	99.9	99.8	99.9
325 (%)	0.013	0.010	0.0060	0.0025
100 (%)	0.060	0.022	0.0007	0.0015
(%)	0.06	0.05	0.05	0.31
(%)	0.282	0.340	0.478	0.365
pH	5.93	6.05	8.42	7.95
(%)	1.48	2.01	0.61	1.55

가가 가
 , 가

(57)

1.

‘ ‘ ‘
‘ ‘ ‘

2.

1 ‘ ‘

1 5 % ‘ ‘

3.

1 ‘ ‘

‘ ‘

4.

1 ‘ ‘

73, MIBC

5.

4 ‘ ‘

73 5.5kg/t 6.5kg/t ‘ ‘

6.

4 ‘ ‘

1 10 ℓ / ‘ ‘

7.

1 ‘ ‘

0.1kg/t 3.5kg/t ‘ ‘

8.

1 ‘ ‘

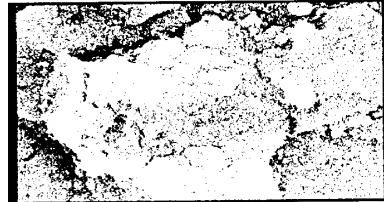
1,000 18,000 가 ‘ ‘ 1 5.5%

‘ ‘

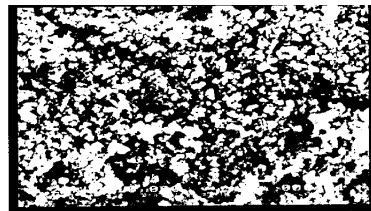
1

슬러지 발생 → 운반 → 분쇄 → 부선 → 초음파 → 자선 → 농축 → 탈수 → 건조

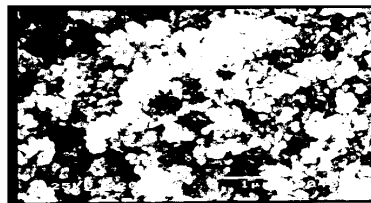
2a



2b



2c

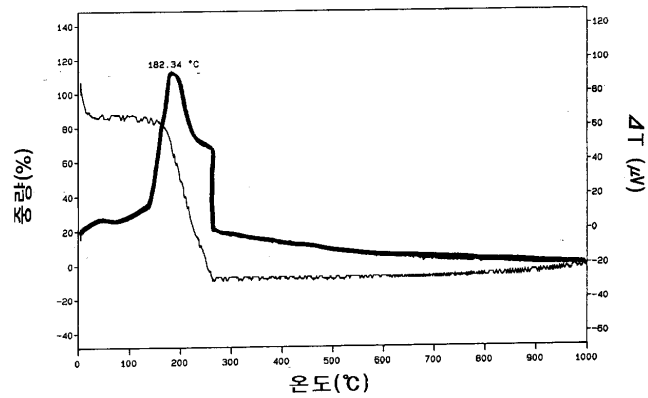


3

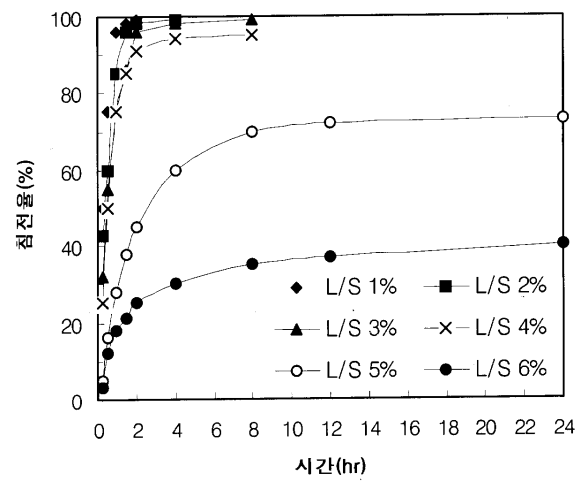
STA 1640B

SMPL ID : CARBON
 RUN ID :
 SIZE : 5.011 mg
 OPERATOR: SOONHEE

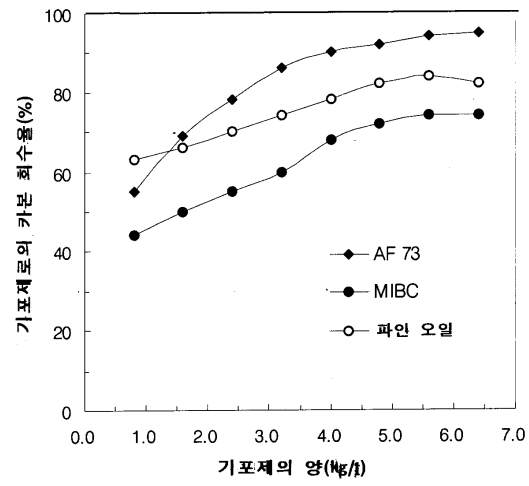
DATE RUN: Feb/23/1999
 GAS 1 : AIR
 GAS 2 :
 COMMENT : TG/DTA



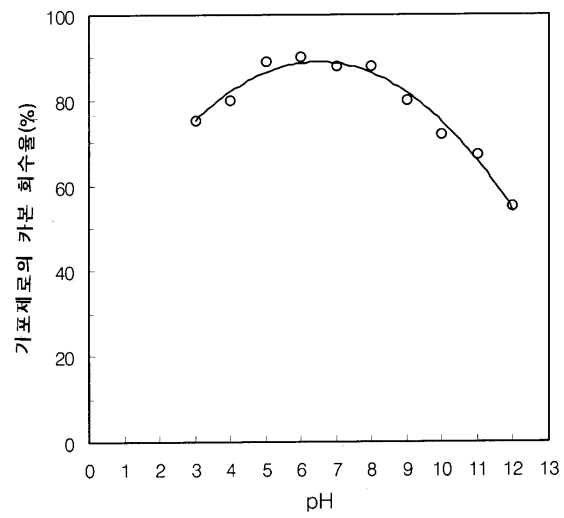
4



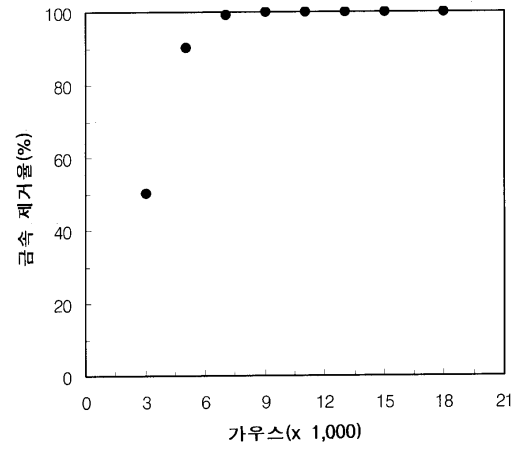
5



6



7



8

