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(11)
(24)

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10-0399634
2003 09 17

(21) 10-2000-0059336
(22) 2000 10 09

(65) 2002-0028383
(43) 2002 04 17

(73) 575

(72) 508

508

(74)

:

(54)

4

- [1]
Li_x MnA₂
- [2]
Li_x MnO_{2-z} A_z
- [3]
Li_x Mn_{1-y} M'_y A₂
- [4]
Li_x Mn_{1-y} M'_y O_{2-z} A_z
- [5]
Li_x Mn₂ O₄
- [6]
Li_x Mn₂ O_{4-z} A_z
- [7]
Li_x Mn_{2-y} M'_y A₄
- [8]
Li_x BA₂
- [9]
Li_x BO_{2-z} A_z
- [10]
Li_x B_{1-y} M''_y A₂
- [11]

가)

1 1

$\text{Li}_x \text{Ni}_{1-y} \text{Co}_y \text{A}_2$
 [12]
 $\text{Li}_x \text{Ni}_{1-y} \text{Co}_y \text{O}_{2-z} \text{A}_z$
 [13]
 $\text{Li}_x \text{Ni}_{1-y-z} \text{Co}_y \text{M}''_z \text{A}_2$
 [14]
 $\text{Li}_{x'} \text{Ni}_{1-y'} \text{Mn}_{y'} \text{M}_{z'} \text{A}$
 (, 0.95 x' 1.1, 0.01 y 0.1, 0.01 z 0.5, 0.95 x' 1, 0.01 y' 0.5, 0 z' 0.
 1, 0.01 0.5 , M' Al, Cr, Mn, Fe, Mg, La, Ce, Sr V
 , M'' Al, Cr, Co, Mg, La, Ce, Sr V
 , A O, F, S P , B Ni Co
 .)

1

1

2 LiCoO_2 ,

3 LiCoO_2 ,

4

5a

5b

5c

5d LiCoO_2

6

7

8

9 Al(OH)_3 Al_2O_3 XRD

10 Al(OH)_3 Al_2O_3

SEM

0.1C

0.5C

1C

가

JCPDS

SEM

SEM

SEM

[]

[]
 가 3.7V, 4V 3C
 LiCoO₂ 95% 가 LiCoO₂
 LiCoO₂ 가 가
 ny Al₂O₃ 1 5 % , Co 가 , So
 (Mass production) , ATB SnO₂ Co LiCo_{1-x}Al_xO₂
 LiCoO₂ - Sn
 LiCoO₂ (98
 -3755). 가

1 14

가)
 [1]
 Li_xMnA₂
 [2]
 Li_xMnO_{2-z}A_z
 [3]
 Li_xMn_{1-y}M'_yA₂
 [4]
 Li_xMn_{1-y}M'_yO_{2-z}A_z
 [5]
 Li_xMn₂O₄
 [6]
 Li_xMn₂O_{4-z}A_z
 [7]
 Li_xMn_{2-y}M'_yA₄
 [8]
 Li_xBA₂
 [9]
 Li_xBO_{2-z}A_z
 [10]
 Li_xB_{1-y}M''_yA₂
 [11]
 Li_xNi_{1-y}Co_yA₂
 [12]
 Li_xNi_{1-y}Co_yO_{2-z}A_z
 [13]
 Li_xNi_{1-y-z}Co_yM''_zA₂
 [14]
 Li_{x'}Ni_{1-y'}Mn_{y'}M_{z'}A
 (, 0.95 x 1.1, 0.01 y 0.1, 0.01 z 0.5, 0.95 x' 1, 0.01 y' 0.5, 0 z' 0.
 1, 0.01 0.5 , M' Al, Cr, Mn, Fe, Mg, La, Ce, Sr V
 , M'' Al, Cr, Co, Mg, La, Ce, Sr V

, A O, F, S P

, B Ni Co

.)

1 14

;

2)

300 800

(LiCoO₂, LiNi_{1-x-y}M_xN_yO₂)

(metal oxide layer)
(metal oxide)

1 14

Mg, Al, Co, K, Na, Ca, Si, Ti, V, Ge, Ga B

M_xN_yO₂

(cycle life), (dicharge potential)

LiCoO₂, LiNi_{1-x-y}
(power)

1 14

(encapsulation)

, CVD(Chemical Vapor Deposition) ; (dip coating)
가

(one-shot process)

1 14

(가 , 가 가

가

(one-sho

t process)

가 , 10 30

(premixing)

50 100 가

가

가

er)

가
1 가

1

(planetary mix

0.1 10 %
0.1 10 %
0.1 10 %

, Na, Ca, Si, Ti, V, Ge, Ga B
(tetraorthosilicate)

. Si

Aldrich

, Mg, Al, Co, K

(V₂O₅)

가 0.1 %

가

1 14
가 10 %

가

200 1

24

1 가 2 (C-rate)

(power)

(3). 가

가

4 4 (), (), (),

80 100 4 (one-shot process)

1 14 1 14

1 14

가 H₃PO₄

(mortar grinder mixing)

(mortar grinder mixing) 가 가 (solvent

-free) 400 600 (semi-crystalline) 1 14

가 400 (blowin

g) (remixing) 700 900 10 15 2 . 2

가 700 (blowing) 1 5 /

1 14 (remixing

)

(1) LiCoO₂ (Nippon Chem : C-10) / / 94/3/3

100μm P Al-

1.6cm 1M LiPF₆ 가

(2)

(3) UMEX LiCoO₂ 1

Honjo $\text{LiNi}_{0.9}\text{Sr}_{0.002}\text{Co}_{0.1}\text{O}_2$ 1

(4)
5 % Al- 95 % Al-
LiCoO₂ (Nippon Chem, : C-10), LiCoO₂ A
I- 500 10, 100, Al₂O₃ 12
3, P, / / 94/3/
1.6cm, 100μm, Al- 1

M LiPF₆ 가

(5)
1% Al- 600

(6)
Honjo $\text{LiNi}_{0.9}\text{Sr}_{0.002}\text{Co}_{0.1}\text{O}_2$ 4

(7)
1% Al- 6

(1)
1 % Al- 99 % Al- 1% Al-
Al- LiCoO₂ (Nippon Chem, : C-10) 1
(planetary mixer), 10 60, Al(OH)₃ (water
circulation), (purging), 1
LiCoO₂ / / 94/3/3
100μm P, 1.6cm
1M LiPF₆ 가

(2)
(3)
(4)
(5)
Honjo $\text{LiNi}_{0.9}\text{Sr}_{0.002}\text{Co}_{0.1}\text{O}_2$ 2

(7)
5% Al- 6
2 3 4 LiCoO₂ (Nippon Chem, : C-10) SEM 5a, 5b 5c
a-d LiCoO₂ (5d), SEM 2 3 5d (5a, 5b
) LiCoO₂ (5d), 4 (5c)

2 3 1 LiCoO₂ (Nippon Chem, : C-10
) 0.1C, 0.5C 1C, 6 8 6
8, 가 (7, 0.5C, 8, 1C) 1
가 1 가
가 2 3
(power)
Al(OH)₃ Al₂O₃, Al- XRD
Al(OH)₃ Al₂O₃ 5g 95g

3, No. 1 600 9
 Al-1, No. 2 130 1, No. 3 3
 Al(OH)₃ Al₂O₃ XRD
 가 (130, 600 10)
 130 10 JCPDS No. 83-2256 Al(O
 H)₃ 600 JCPDS No. 02-1373 Al₂O₃

가

(Power)

(57)

1.
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 2.
() 1 14 ;
가) (,)
- [1]
Li_xMnA₂
 - [2]
Li_xMnO_{2-z}A_z
 - [3]
Li_xMn_{1-y}M'_yA₂
 - [4]
Li_xMn_{1-y}M'_yO_{2-z}A_z
 - [5]
Li_xMn₂O₄
 - [6]
Li_xMn₂O_{4-z}A_z
 - [7]
Li_xMn_{2-y}M'_yA₄
 - [8]
Li_xBA₂
 - [9]
Li_xBO_{2-z}A_z
 - [10]
Li_xB_{1-y}M''_yA₂
 - [11]
Li_xNi_{1-y}Co_yA₂
 - [12]
Li_xNi_{1-y}Co_yO_{2-z}A_z
 - [13]
Li_xNi_{1-y-z}Co_yM''_zA₂
 - [14]
Li_{x'}Ni_{1-y'}Mn_{y'}M_{z'}A₂
- (, 0.95 x 1.1, 0.01 y 0.1, 0.01 z 0.5, 0.95 x' 1, 0.01 y' 0.5, 0 z' 0.
 1, 0.01 0.5 , M' Al, Cr, Mn, Fe, Mg, La, Ce, Sr V

, M" Al, Cr, Co, Mg, La, Ce, Sr V
 , A O, F, S P

, B Ni Co

.)

3.

1 14

;

- [1]
Li_xMnA₂
- [2]
Li_xMnO_{2-z}A_z
- [3]
Li_xMn_{1-y}M'_yA₂
- [4]
Li_xMn_{1-y}M'_yO_{2-z}A_z
- [5]
Li_xMn₂O₄
- [6]
Li_xMn₂O_{4-z}A_z
- [7]
Li_xMn_{2-y}M'_yA₄
- [8]
Li_xBA₂
- [9]
Li_xBO_{2-z}A_z
- [10]
Li_xB_{1-y}M"_yA₂
- [11]
Li_xNi_{1-y}Co_yA₂
- [12]
Li_xNi_{1-y}Co_yO_{2-z}A_z
- [13]
Li_xNi_{1-y-z}Co_yM"_zA₂
- [14]
Li_{x'}Ni_{1-y'}Mn_{y'}M_{z'}A

(, 0.95 x 1.1, 0.01 y 0.1, 0.01 z 0.5, 0.95 x' 1, 0.01 y' 0.5, 0 z' 0.
 1, 0.01 0.5 , M' Al, Cr, Mn, Fe, Mg, La, Ce, Sr V

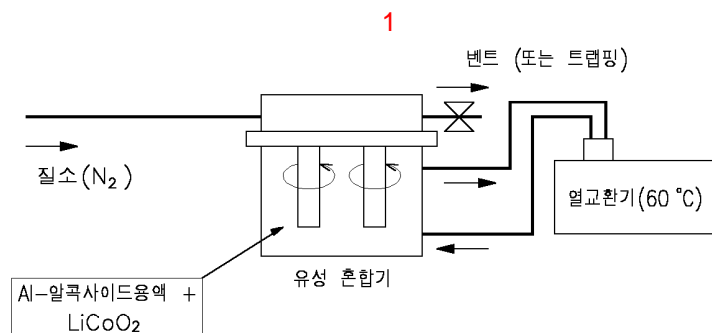
, M" Al, Cr, Co, Mg, La, Ce, Sr V
 , A O, F, S P

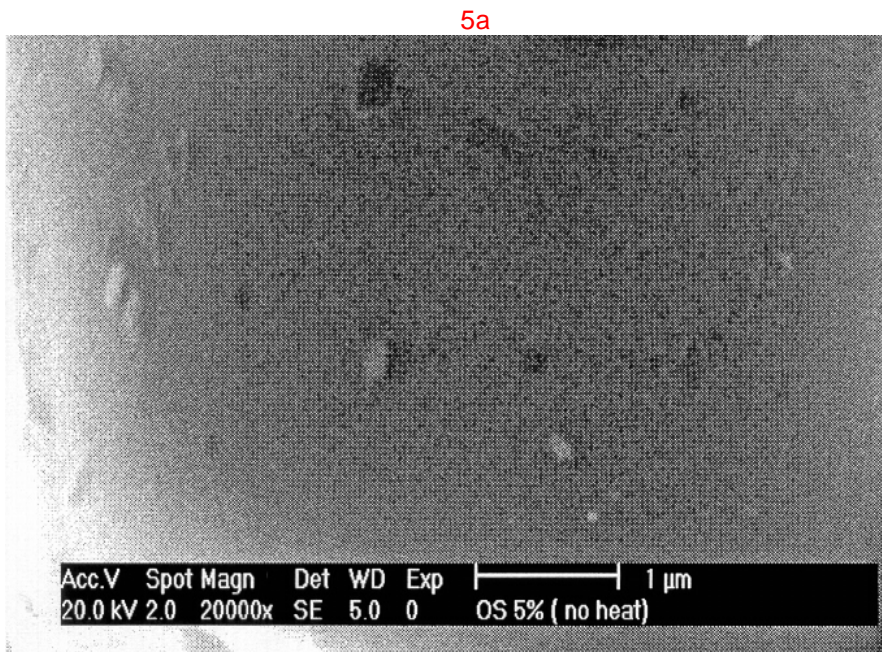
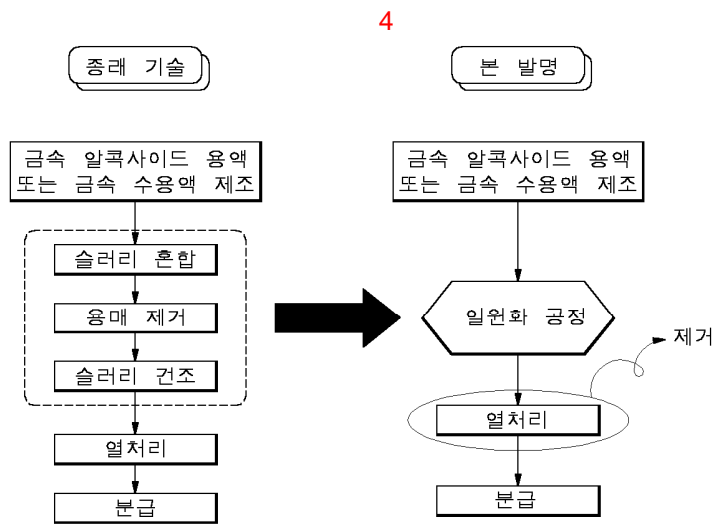
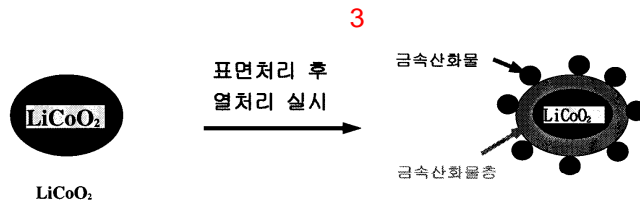
, B Ni Co

.)

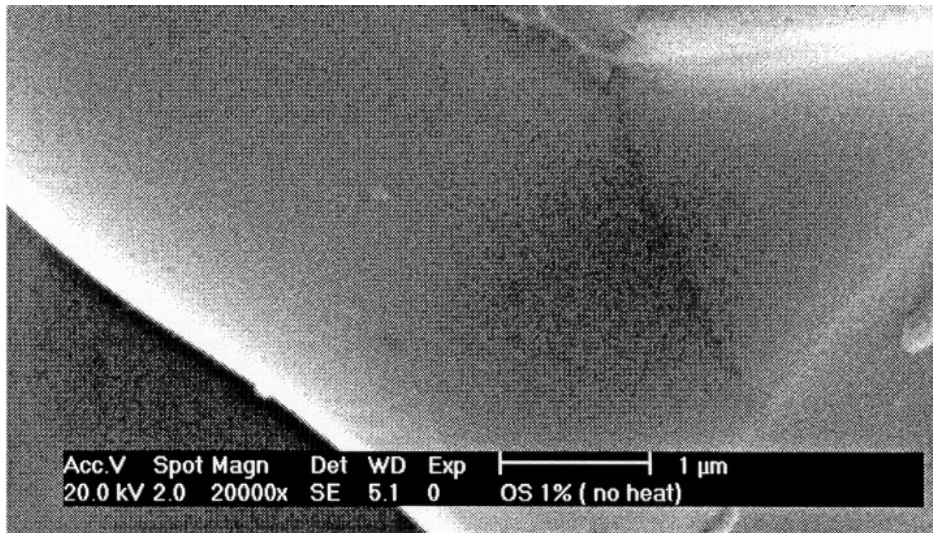
4.

3 가 , 가 가

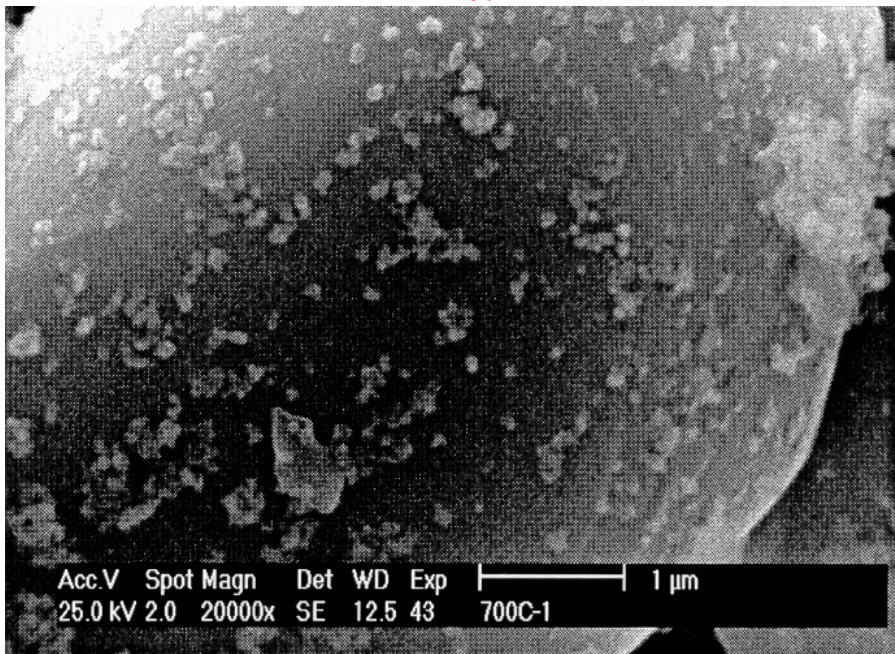




5b



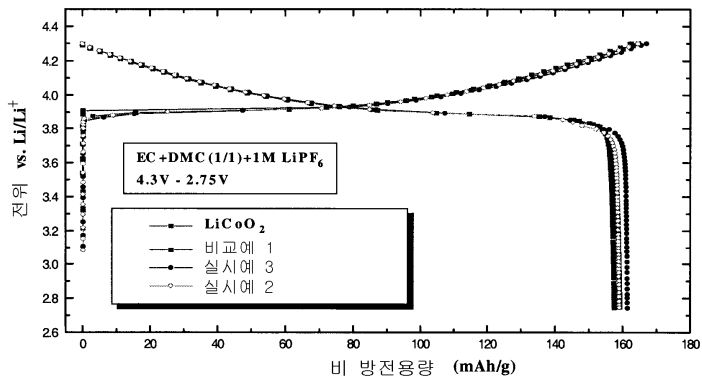
5c



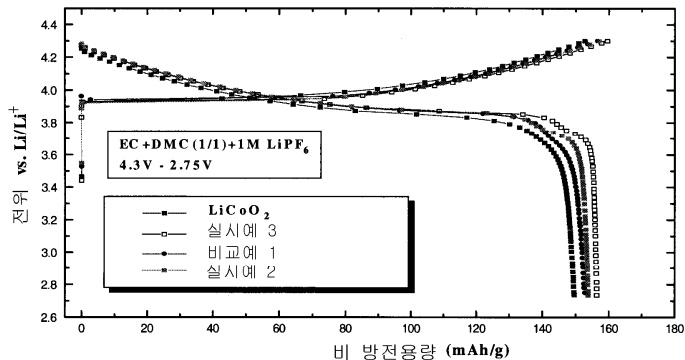
5d



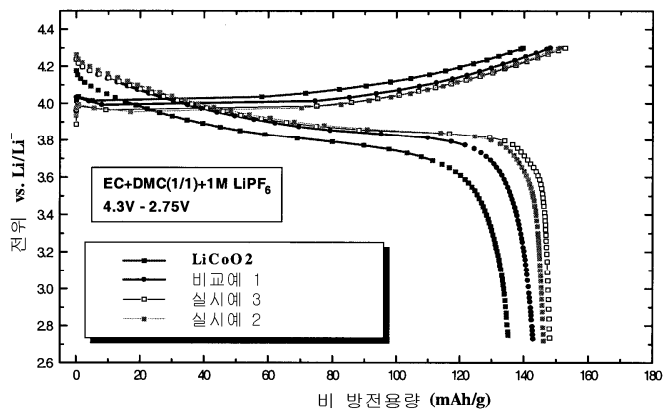
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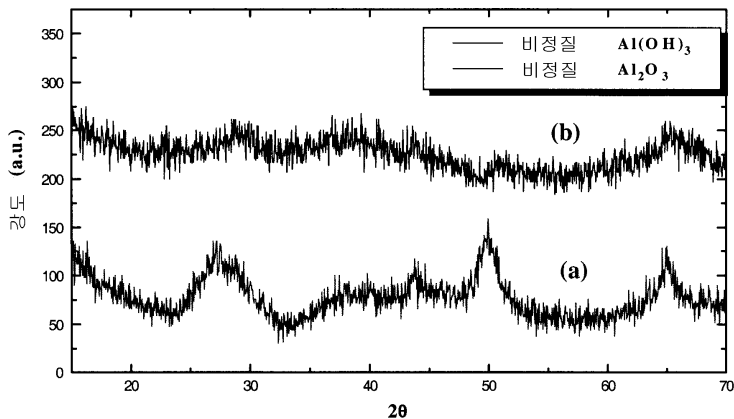
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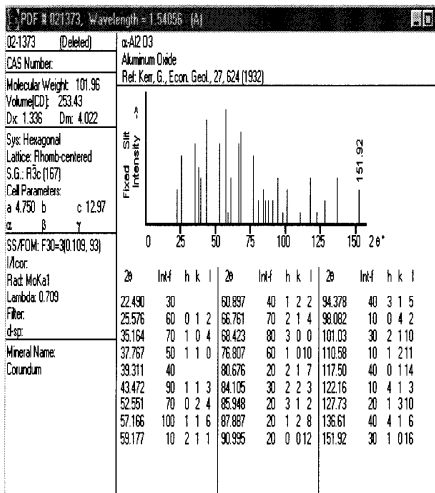


8

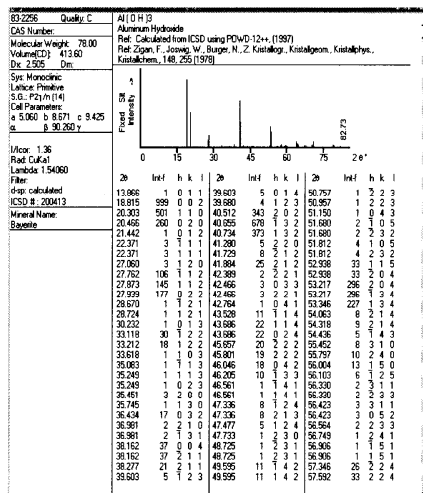


9





JCPDS Card No 02-1373 (Al₂O₃)



JCPDS Card No 83-2256 (Al(OH)₃)