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2003-0097009  
2003 12 31

(21) 10-2002-0034130  
(22) 2002 06 18

(71) 575

(72) 107 405

827 155 803

(74)

:

(54)

( )

( )

1

1

1-2

1

2

가

가

가

2

가

가

가

가

가

가

가

( )

(-OH)

( )

( ) ( )

1

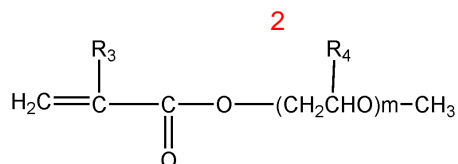
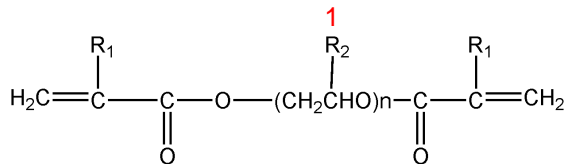
( )

2

( )

;

;



, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> H CH<sub>3</sub>, n m 1 100,000

( ) ( ) 1 20  
 , 5 20 , 1 20 , 1 20  
 -OC(=O)(CH<sub>2</sub>)<sub>n</sub>OC(=O)CH=CH<sub>2</sub> -OC(=O)(CH<sub>2</sub>)<sub>n</sub>OC(=O)C(CH<sub>3</sub>)=CH<sub>2</sub> (n 1 20 )  
 , -OC(=O)(CH<sub>2</sub>)<sub>3</sub>CH<sub>3</sub>, -OC(=O)Ar( , Ar  
 O)(CH<sub>2</sub>)<sub>n</sub>CH<sub>3</sub> (n 1 20 ) -OC(=O)(CH<sub>2</sub>)<sub>n</sub>O(CH<sub>2</sub>)<sub>n</sub>CH<sub>3</sub> (n 1 20 ) , -O(C=O)(CH<sub>2</sub>)<sub>n</sub>OC(=O)(CH<sub>2</sub>)<sub>n</sub>CH<sub>3</sub> (n 1 20 )  
 ) -C(=O)CH=CH<sub>2</sub>

( ) ( )  
 1: 0.01 1: 100

2 ( ) ( ) , 1 ( )  
 ( ) 1:0.0001 0.0001:1

( ) ( ) , 1 ( )  
 2 ( ) , 가 1:0.1  
 1:50

가, (dibenzoyl peroxide), (succinic peroxide),  
 (dilauryl peroxide), (didecanoyl peroxide), (dicumyl peroxide),  
 de), - (di-t-butylperoxide), 2,5- -2,5- ( - ) (2,5-dimethyl-2,5-  
 -di-(t-butylperoxy) hexane), - (a-cumyl peroxy-neodecanoate), 1,1-  
 -3- -2- (1-1-dimethyl-3-hydroxybutyl peroxy-2-ethyl hexanoate),  
 te), - (t-amyl peroxy-benzoate), - (t-butyl peroxy-pivalate),  
 te), 2,5- -2,5- (2,5-dihydroperoxy-2,5-dimethylhexane),  
 (cumene hydroperoxide), - (t-butyl hydroperoxide), 1,1,- -( -  
 )- (1,1-di-(t-amylperoxy)-cyclohexane), 2,2- -( - ) (2,2-di-(t-butyl peroxy)butane),  
 3,3- 3,3- -( - )-(Ethyl 3,3-di-(t-butylperoxy)-butylate), (n-  
 utyl) peroxy-dicarbonate), (di(n-propyl) peroxy-dicarbonate), (sec- ) - (di(sec-butyl) peroxy-dicarbonate), (2- ) - (di(2-ethyl hexyl)peroxy-dicarbonate),  
 , m- (m-yoluoyl peroxide), t- -2-  
 , t- ,  
 , - (4-t- ) ,  
 , 3,3,5- ,  
 ) , 2 ( ) ( ) , 1 100 ( )  
 ( ) ( )

0.0001 10

N-

( ) , ( ) ( ) ( ) 1 100  
 0.01 2 .

3 1 ( ) ( ) 140 170 4,400,000 ,  
 4,400,000 .

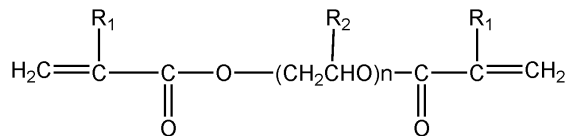
(LiCF<sub>3</sub>SO<sub>3</sub>) (LiClO<sub>4</sub>), (LiBF<sub>4</sub>), (LiPF<sub>6</sub>),  
 (LiN(CF<sub>3</sub>SO<sub>2</sub>)<sub>2</sub>) 0.1 10

, 2- , , 100 , 90 99.9 .

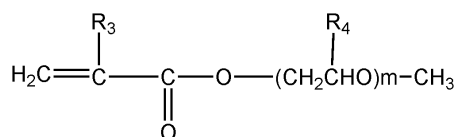
(a-1) (-OH) ( ) ( ) ;  
 1 ( ) 2 ( ) ;

(b-1)

< 1>



< 2>



, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> R<sub>4</sub> H CH<sub>3</sub> , n m 1 100,000

(b-1) 40 90

(b-1)

/ , / 3 , / / 2 3 ,

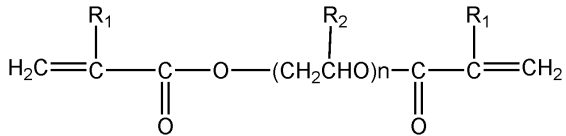
( ) , (a-2) (-OH) ( ) ( ) ( ) ;  
 ) 1 ( ) ( ) ; 2 ( )

(b-2)

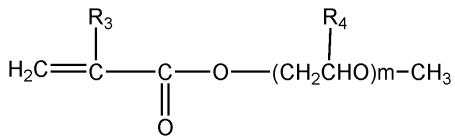
(c-2) (b-2)

가

< 1>



< 2>



, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> H CH<sub>3</sub>, n m 1 100,000

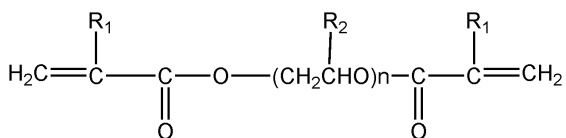
(c-2) , 40 90

(c-2)

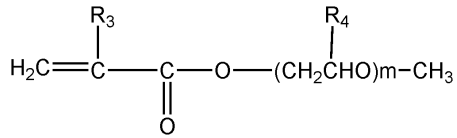
2 ( ) 1 가 ( )

( ) , (-OH) ( ) ( ) ( ) ( ) 2  
 ( ) 1 가

< 1>



< 2 >



, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> R<sub>4</sub> H CH<sub>3</sub>, n m 1 100,000

( ) ( ) 가 2 가 ( )

가

( ) 가 ( ) ( )

가

가

( ) 가 ( ) ( )

가

가 3 가 3 가

(trimethylol), (triethylol), (tripropylol) (trialkylol), (glycerol), (pentaerythritol), (dipentaerythritol) (eryt hritol)

( )

(Lactone)

가

가

1 0.01 10 1000 mol%

가 (Lactone) 1 0.001 0.5 가

가

1 50, 2 ~ 10 1

( )

MA, ( ) ( , ( ) )( , ( ) )  
 'MA' )  
 MA .  
 , MA 가 ,  
 1 MA 1 MA .  
 , MA 1  
 20 20 , 5 20 MA , 1 20 , 1 1  
 20 MA RX 1 : 0 1 : 10 ( 'RX' ) MA RX 가 1 : 0 , 1  
 가 가 . RX 가  
 , 5 RX 20 1 20 ,  
 1 20 , 1 20 ,  
 가 .  
 , (Pyridine), , 가  
 1 0.01 가 , MA ( ) 1 , 0.000  
 , 가 (meth)acrylic acid , , 0.1  
 ~ 10 MA RX (RX) , ( ,  
 0 가 1 : 0 1 : 10 MA RX 가 1 : ,  
 가 가 가 . RX  
 , 3 ( )  
 ( ) ( )  
 1 20 , 5 20 , 1 20 , 1  
 20 ), -OC(=O)(CH<sub>2</sub>)<sub>3</sub>CH<sub>3</sub>, -OC(=O)Ar( , Ar  
 n CH<sub>3</sub> (n 1 20 ), -O(C=O)(CH<sub>2</sub>)<sub>n</sub>OC(=O)(CH<sub>2</sub>)  
 ), -O(C=O)(CH<sub>2</sub>)<sub>n</sub>OC(=O)CH=CH<sub>2</sub> , -O(C=O)(CH<sub>2</sub>)<sub>n</sub>OC(=O)C(CH<sub>3</sub>)  
 =CH<sub>2</sub> (n 1 20 , 1 6 .  
 ( ) 1 : 0.01 1 : 100 , 1  
 : 0.5 ( ) 1 : 3 .  
 1 ( ) ( )  
 ( ) , ( )<sup>2</sup> ( ) ( )  
 , (-OH) (

) , ( ) ( ) ( ) , 1  
 ( ) ( ) 2 ( ) ( ) , 1  
 가 ( ) ( )  
 ( ) ( ) ( ) 300 100,000  
 , 가 1:0.1 1:50  
 , 1  
 ( ) 2 ( ) ( )  
 1:0.0001 0.0001:1 1 1:0.01 0.01:1 2  
 ( ) 가 가  
 , 1 ( ) 170 4,400,000 , 200  
 100,000 ( ) ( )  
 , 1 ( ) 140 4,400,000 , 200  
 100,000 ( ) ( )  
 가 , , , 100 ,  
 N- 0.01 2.0 , 0.01 2.0  
 (dilauryl peroxide), (dibenzoyl peroxide), (succinic peroxide),  
 uoyl peroxide) (diacyl peroxides), (didecanoyl peroxide), m- (m-tol  
 peroxy) hexane), (di-t-butylperoxide), 2,5- -2,5- ( - ) (2,5-dimethyl-2,5-di-(t-butyl  
 peroxides), - , 3,3,5- (dialkyl  
 -2- (a-cumyl peroxy-neodecanoate), 1,1- -3-  
 (1-1-dimethyl-3-hydroxybutyl peroxy-2-ethyl hexanoate), -  
 (t-amyl peroxy-benzoate), - (t-butyl peroxy-pivalate), t- -2-  
 , t- , t- (peroxy est  
 ers), 2,5- -2,5- (2,5-dihydroperoxy-2,5-dimethylhexane),  
 (cumene hydroperoxide), - (t-butyl hydroperoxide)  
 (tertiary alkyl hydroperoxides), 1,1,- -( - )- (1,1-di-(t-amylperox  
 y)-cyclohexane), 2,2- -( - ) (2,2-di-(t-butyl peroxy)butane), 3,3- 3,3- -(  
 - )- )-(Ethyl 3,3-di-(t-butylperoxy)-butylate) (peroxy ketals), (n-  
 ) - (di(n-propyl) peroxy-dicarbonate), (sec- ) - (di(sec-but  
 yl) peroxy-dicarbonate), (2- ) - (di(2-ethyl hexyl)peroxy-dicarbonate), t-  
 ) , , - (4-t-  
 (peroxydicarbonates), (azos)  
 , 100 0.0001 10



가

가

, 25

가 85

25

85

, 60

80  
가

, e- , -

가

, 2-

100

90

99.9

(LiCF<sub>3</sub>SO<sub>3</sub>)

(LiClO<sub>4</sub>),

(LiBF<sub>4</sub>),

(LiN(CF<sub>3</sub>SO<sub>2</sub>)<sub>2</sub>)

(LiPF<sub>6</sub>),

100

0.1

10

가

가

(stacking)

(winding)

가

가

가

가

g)

(stacking)

(windin

/

/

3

/

/

2

3

가

가

가

가

25

85

, 60

80

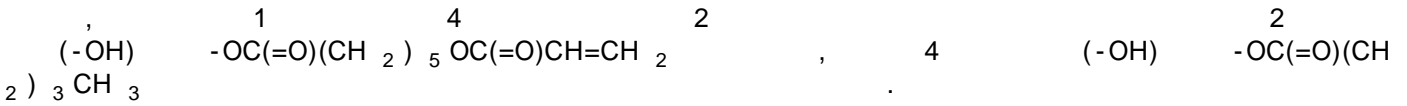
2 ( ) 1 / 3 가 ( ) ,

5 90 $\mu$ m

가 , , 가가 .

< 1>

0.01 % (dipentaerythritol) 1 , - 2 가 50 가



< 1>

B     $\text{LiPF}_6$  ( 30:55:5:10 ) 30g    0.01g    0.9g 1.3mol/L  $\text{LiPF}_6$  가    EC DEC PC F    75 4

< 2>

< 3>

$\text{LiCoO}_2$  94g, -P 3g    (PVDF) 3g N- -2- 4.9cm, 가 147 $\mu$ m Al-

(MCF: Petoca ) 89.8g, 0.2g, PVDF 10g N- -2- 5.1cm, 가 178 $\mu$ m

3:7 ,    80 2    1.3M  $\text{LiPF}_6$  EC:DEC

< 4>

1 2 ,  
 3 .

< 1>  
 , 1 , 1 1g  
 , 1 .

< 2>  
 1 1 ,  
 3 .

1-2 1 , 1 .  
 1 , 1 가  
 , 1-2 . ( ) 가  
 가 .

3-4 2 가 가 .  
 40kgf/cm<sup>2</sup> 가 가 .  
 가 1 .

[ 1 ]

	가 (g)	가 (g)	(mg)	
2	17.2665	17.2035	63	
3	17.2537	17.2512	2.5	
4	17.2587	17.2568	1.9	

1 , 3 4 2 가 가  
 , 2 2 가 3 4

( ) 가 ( )

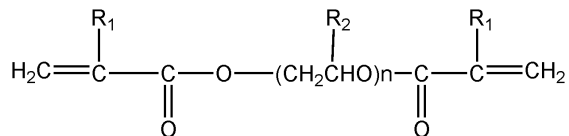
(57)

1.  
 (-OH) ( ) ,

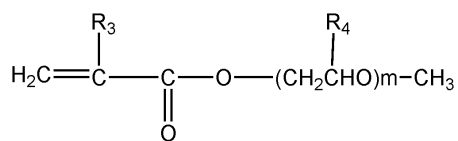
( ) ( ) ;

1 ( ) ; 2 ( ) ;

< 1>



< 2>



, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> H CH<sub>3</sub>, n m 1 100,000

2.

1 ( ) ( ) ; 20 ( ) ( ) ; 1 20 ( ) ; 1 20 ( ) ;

3.

1 ( ) ( ) ; C(=O)(CH<sub>2</sub>)<sub>n</sub>OC(=O)CH=CH<sub>2</sub> ; -OC(=O)(CH<sub>2</sub>)<sub>n</sub>OC(=O)C(CH<sub>3</sub>)=CH<sub>2</sub> (n 1 20) ;  
 ( ) ; -OC(=O)(CH<sub>2</sub>)<sub>n</sub>OC(=O)(CH<sub>2</sub>)<sub>3</sub>CH<sub>3</sub> ; -OC(=O)Ar( ) ; Ar ;  
 ( ) ; -OC(=O)(CH<sub>2</sub>)<sub>n</sub>OC(=O)(CH<sub>2</sub>)<sub>n</sub>CH<sub>3</sub> (n 1 20) ; -OC(=O)(CH<sub>2</sub>)<sub>n</sub>OC(=O)(CH<sub>2</sub>)<sub>n</sub>CH<sub>3</sub> (n 1 20) ;  
 ( ) ; -OC(=O)(CH<sub>2</sub>)<sub>n</sub>OC(=O)C(CH<sub>3</sub>)=CH<sub>2</sub> ;

4.

1 ( ) ( ) ; 가 1: 0.01 1: 100 ;

5.

1 ( ) ( ) ; 1 ( ) 2 ( ) ; 1:0.0001 0.0001:1 ;

6.

1 ( ) ( ) ; 1 ( ) 2 ( ) ; 가 1:0.1 1:50 ;

7.

1 , ,

8.

7 , 가, (dibenzoyl peroxide), (succinic peroxide), (dilauryl peroxide), (didecanoyl peroxide), (dicumyl peroxide), - - (di-t-butylperoxide), 2,5- -2,5- ( - ) (2,5-dimethyl-2,5-di-(t-butylperoxy) hexane), - - (a-cumyl peroxy-neodecanoate), 1,1- -3- -2- (1-1-dimethyl-3-hydroxybutyl peroxy-2-ethyl hexanoate), - (t-amyl peroxy-benzoate), - (t-butyl peroxy-pivalate), 2,5- -2,5- (2,5-dihydroperoxy-2,5-dimethylhexane), (cumene hydroperoxide), - (t-butyl hydroperoxide), 1,1,- -( - )- (1,1-di-(t-amylperoxy)-cyclohexane), 2,2- -( - ) (2,2-di-(t-butyl peroxy)butane), 3,3- 3,3- -( - )- ) (Ethyl 3,3-di-(t-butylperoxy)-butylate), (n- ) - (di(n-propyl) peroxy-dicarbonate), (sec- ) - (di(sec-butyl) peroxy-dicarbonate), (2- ) - (di(2-ethyl hexyl)peroxy-dicarbonate), (m- ) (m-yoluoyl peroxide), t- -2- , t- , m- , t- , -(4-t- ) , 3,3,5-

10 2 ( ) ( ) , 1 100 ( ) 0.0001

9.

7 , 가 , , N-

2 ( ) ( ) ( ) 1 100 ( ) 0.01 2

10.

1 0 , 1 ( ) 170 4,400,00

11.

1 , 2 ( ) 140 4,400,000

12.

1 , (LiCF<sub>3</sub>SO<sub>3</sub>) , (LiClO<sub>4</sub>), (LiBF<sub>4</sub>), (LiPF<sub>6</sub>), (LiN(CF<sub>3</sub>SO<sub>2</sub>)<sub>2</sub>) 100 0.1 10

13.

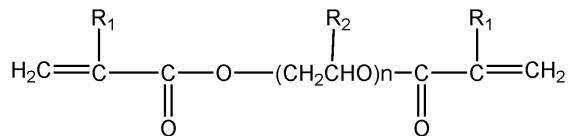
1 , 가 , , 2- , , , 100 , 90 99 .9

14.

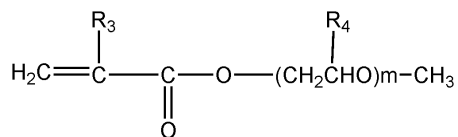
(a-1) (-OH) ( ) ( ) ;  
 , ( ) ( ) ;  
 1 ( ) ; 2 ( ) ;

(b-1) 1 13 ;

< 1 >



< 2 >



, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> H CH<sub>3</sub>, n m 1 100,000

15.

14 (b-1) 40 90

16.

14 (b-1)

17.

1 13

18.

17

19.

18 , / , / 3 , / /  
 2 , / , / 3 , / /  
 3

20.

(a-2) (-OH) ( ) ( ) ;  
 , ( ) ( ) ;  
 1 ( ) ( ) ; 2 ( )

) ( ) ;

;

(b-2)

, ;

(c-2)

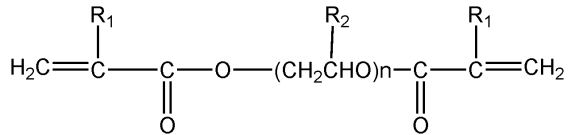
(b-2)

1

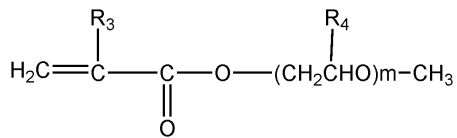
13

, 가

< 1>



< 2>



, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> R<sub>4</sub>

H CH<sub>3</sub>, n m

1 100,000

**21.**

20, (c-2), 40 90

**22.**

20, (c-2),

1

