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C09K 11/06

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2004 12 10

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(87)

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(JP)

(71) 가가

가 4 1 8

가 가  
가 7 2 35

(72) 13 21-1-3-404

가 7 2 35 가 가

가 7 2 35 가 가

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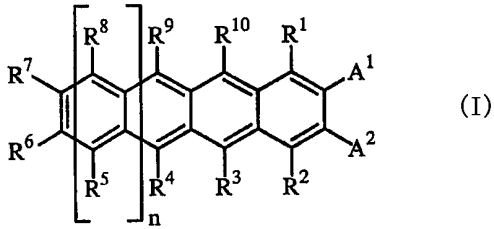
(74) :

(54)

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< l>



[ R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup>, A<sup>2</sup> ]

(電界)

EL 가 [ Appl. Phys. Lett., 51, 913(1987) ] .

(exciton) 가 (失活)

V ~ V 가

(輝度)가

4,4'- [ N- -N-(3'- ) ]

J. Appl. Phys., 27, L269(1988) ] .

[ Jpn.

(coumarin)

(dopant)

. Appl. Phys., 65, 3610(1989) ] .

(8- )

가

[ J

(acridone)

(2- -8- )(4-

)

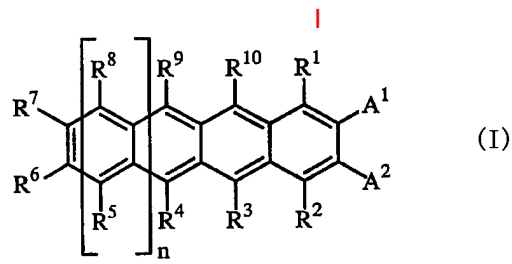
가

( , N- -2- ) ( )8-67873 ) .

가

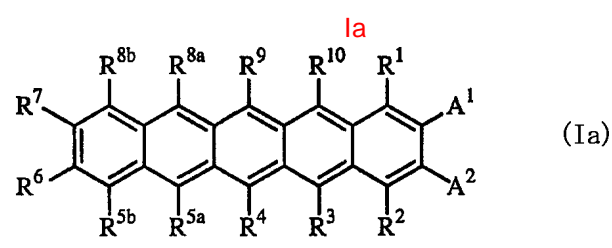
가

I



[ $R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9$ ,  $R^{10}$  가 C<sub>1</sub>~C<sub>40</sub>; 가 C<sub>6</sub>~C<sub>40</sub>; 가 C<sub>4</sub>~C<sub>40</sub>; 가 C<sub>1</sub>~C<sub>40</sub>; 가 C<sub>1</sub>~C<sub>40</sub>; 가 (-N(R<sup>11</sup>))- (R<sup>11</sup>);  
 $A^1$ ,  $A^2$  가 C<sub>1</sub>~C<sub>40</sub>; 가 C<sub>2</sub>~C<sub>40</sub>; 가 C<sub>7</sub>~C<sub>40</sub>; 가 (-CN); 가 (-C(=O)-X); 가 (-C(=O)-H); 가 (-C(=O)-B-C( ));  
 $H_2$ ); (-C(=O)-X, X, (-C(=O)-H);  $A^1$ ,  $A^2$  가 (-C(=O)-B-C( ));  
 =O)-, C<sub>1</sub>~C<sub>40</sub>, (B) (-N(B<sup>1</sup>)-) (B<sup>1</sup>)

n 1,  $R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, R^{10}, A^1, A^2$  가  
 $R^7, A^1, A^2, R^6$  가  
 n 1  
 $R^1, R^2, R^4, R^9, R^3, R^5, R^8, R^{10}$   
 $R^3, R^{10}, R^4, R^9$  가  
 n 2 I Ia



(<sup>10</sup> , A<sup>1</sup> A<sup>2</sup> , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup> R<sup>11</sup>)  
<sub>11</sub>)-<sup>4</sup>-C<sub>40</sub> ; 가 C<sub>1</sub>~C<sub>40</sub> ; 가 C<sub>6</sub>~C<sub>40</sub> ; 가 C<sub>1</sub>~C<sub>40</sub> ; 가 R<sup>6</sup> R<sup>7</sup> ; 가 C<sup>11</sup>  
 .) R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> 1  
 .]

I , n=1 2 ,

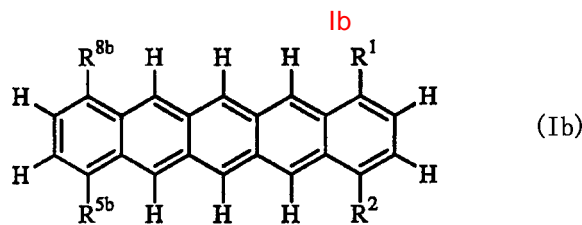
n 1

R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> 가 , R<sup>3</sup>, R<sup>4</sup>, R<sup>9</sup>  
 R<sup>10</sup> , R<sup>1</sup>, R<sup>2</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, A<sup>1</sup> A<sup>2</sup> 가 , R<sup>1</sup>,  
 R<sup>2</sup>, R<sup>4</sup> R<sup>9</sup> , R<sup>3</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> 가  
 , R<sup>3</sup>, R<sup>5</sup>, R<sup>8</sup> R<sup>10</sup> , R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>9</sup>, A<sup>1</sup> A<sup>2</sup> 가 ,

, n 2 la ,

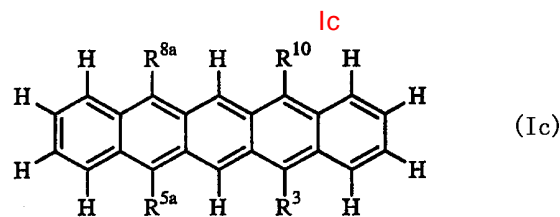
la , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> 가  
 , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup> R<sup>10</sup> , R<sup>6</sup>, R<sup>7</sup>,  
 A<sup>1</sup> A<sup>2</sup> 1 , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> 6 가 가

lb ,



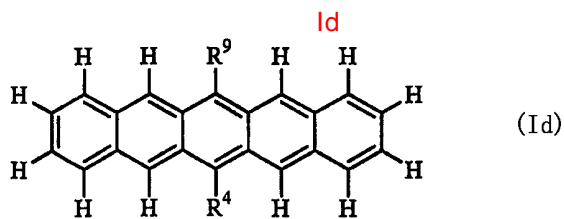
[ , R<sup>1</sup>, R<sup>2</sup>, R<sup>5b</sup> R<sup>8b</sup> 가 .]

lc



[ , R<sup>3</sup>, R<sup>5a</sup>, R<sup>8a</sup> R<sup>10</sup> 2 , R<sup>3</sup>, R<sup>5a</sup>, R<sup>8a</sup> R<sup>10</sup> 1 , R<sup>3</sup>, R<sup>5a</sup>, R<sup>8a</sup> R<sup>10</sup> 1 .]

Id



[ , R<sup>4</sup> R<sup>9</sup> , , , , .]

I , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> 5

I , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> 6

5b, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> 5 , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> 6

Ia , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup>

Ia , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup>

Ia , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup>

Ia , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup>

Ia , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup>

I , R<sup>1</sup> R<sup>2</sup>, R<sup>3</sup> R<sup>10</sup>, R<sup>4</sup> R<sup>9</sup>, R<sup>5</sup> R<sup>8</sup>, R<sup>6</sup> R<sup>7</sup>, A<sup>1</sup> A<sup>2</sup>

Ia , R<sup>1</sup> R<sup>2</sup>, R<sup>3</sup> R<sup>10</sup>, R<sup>4</sup> R<sup>9</sup>, R<sup>5a</sup> R<sup>8a</sup>, R<sup>5b</sup> R<sup>8b</sup>, R<sup>6</sup> R<sup>7</sup>, A<sup>1</sup>

A<sup>2</sup>

I , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup> R<sup>10</sup> , 가 가  
 C<sub>1</sub>~C<sub>40</sub> ; 가 C<sub>1</sub>~C<sub>40</sub> , 가  
 C<sub>6</sub>~C<sub>40</sub>

가 가 Ia, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>  
 C<sub>1</sub>~C<sub>40</sub>; 가 C<sub>1</sub>~C<sub>40</sub>,  
 C<sub>6</sub>~C<sub>40</sub>

I, R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup>, R<sup>9</sup> 가  
 C<sub>1</sub>~C<sub>40</sub>, 가 C<sub>2</sub>~C<sub>40</sub> C<sub>6</sub>~C<sub>18</sub>; A<sup>1</sup>, A<sup>2</sup>  
 ; n 1

가 I, A<sup>1</sup>, A<sup>2</sup>, R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup>, R<sup>9</sup>  
 C<sub>1</sub>~C<sub>40</sub> 가 C<sub>6</sub>~C<sub>18</sub>; n 1

가 I, R<sup>3</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>10</sup>  
 C<sub>1</sub>~C<sub>40</sub>, 가 C<sub>6</sub>~C<sub>18</sub>; A<sup>1</sup>, A<sup>2</sup>  
 ; n 1

가 가 C<sub>2</sub>~C<sub>40</sub> 가 Ia, R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8b</sup>, R<sup>9</sup>  
 C<sub>1</sub>~C<sub>40</sub>, 가 C<sub>6</sub>~C<sub>18</sub>, A<sup>1</sup>, A<sup>2</sup>가

4, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8b</sup>, R<sup>9</sup> 가 Ia, A<sup>1</sup>, A<sup>2</sup>, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>  
 C<sub>6</sub>~C<sub>18</sub> 가 C<sub>1</sub>~C<sub>40</sub> 가

, R<sup>3</sup>, R<sup>5a</sup>, R<sup>8a</sup>, R<sup>10</sup> 가 Ia, A<sup>1</sup>, A<sup>2</sup>가  
 C<sub>6</sub>~C<sub>18</sub> 가 C<sub>1</sub>~C<sub>40</sub> 가

1

1

1

1

가 (多環)

(錯體)

1

0.1~40 %

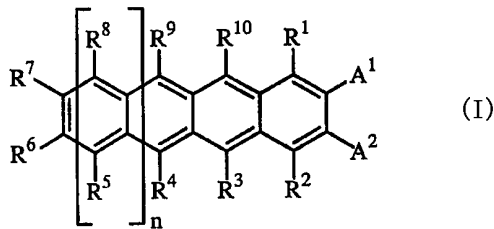
- 
- 1 (A) .
  - 2 (B) .
  - 3 (C) .

- 4 (D) .
- 5 (E) .
- 6 (F) .
- 7 (G) .
- 8 (H) .

I

( , 1 ) ,

[ I ]



[ , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> .]

I , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup> R<sup>10</sup>  
 , ; 가 가 C<sub>1</sub>~C<sub>40</sub> ; 가 C<sub>1</sub>~C<sub>40</sub>  
 , 가 C<sub>6</sub>~C<sub>40</sub> ; , .

C<sub>1</sub>~C<sub>40</sub> (非環式) ,  
 . C<sub>1</sub>~C<sub>40</sub> 가 , C<sub>1</sub>~C<sub>40</sub>  
 C<sub>1</sub>~C<sub>40</sub> , C<sub>2</sub>~C<sub>40</sub> , C<sub>2</sub>~C<sub>40</sub> , C<sub>3</sub>~C<sub>40</sub> , C<sub>4</sub>~C<sub>40</sub>  
 , C<sub>4</sub>~C<sub>40</sub> , C<sub>6</sub>~C<sub>18</sub> , C<sub>6</sub>~C<sub>40</sub> , C<sub>6</sub>~C<sub>40</sub> , C<sub>4</sub>~C<sub>40</sub>  
 , C<sub>4</sub>~C<sub>40</sub> .

C<sub>1</sub>~C<sub>40</sub> , C<sub>2</sub>~C<sub>40</sub> , C<sub>2</sub>~C<sub>40</sub> , C<sub>3</sub>~C<sub>40</sub> , C<sub>4</sub>~C<sub>40</sub> C  
 4~C<sub>40</sub> C<sub>1</sub>~C<sub>20</sub> , C<sub>2</sub>~C<sub>20</sub> , C<sub>2</sub>~C<sub>20</sub> , C<sub>3</sub>~C<sub>20</sub> , C  
 4~C<sub>20</sub> C<sub>4</sub>~C<sub>20</sub> , C<sub>1</sub>~C<sub>10</sub> , C<sub>2</sub>~C<sub>10</sub> , C<sub>2</sub>  
 ~C<sub>10</sub> , C<sub>3</sub>~C<sub>10</sub> , C<sub>4</sub>~C<sub>10</sub> C<sub>4</sub>~C<sub>10</sub> .

가 , , ,  
 , n- , t- , , -n- , 2,2,2- , , 2-  
 , 4- , , 4- , 4- , 3- , 4- , 2- , 3  
 가 , ,  
 , 2- , t- .

가 , 4-

가

가

가 -Si(R<sup>12</sup>)(R<sup>13</sup>)(R<sup>14</sup>) [ , R<sup>12</sup>, R<sup>13</sup> R<sup>14</sup> ; ; ]

C<sub>6</sub>~C<sub>40</sub> ; C<sub>6</sub>~C<sub>40</sub> ; C<sub>1</sub>~C<sub>40</sub> ; C<sub>1</sub>~C<sub>40</sub> ;

가

C<sub>1</sub>~C<sub>40</sub> , C<sub>1</sub>~C<sub>40</sub> , C<sub>6</sub>~C<sub>40</sub> , 가

, C<sub>6</sub>~C<sub>40</sub> , 가 . C<sub>1</sub>~C<sub>40</sub> , C<sub>1</sub>~C<sub>40</sub> 가

R<sup>6</sup> R<sup>7</sup> 가 R<sup>6</sup> C<sub>4</sub>~C<sub>40</sub> 가 4~16 (員環) , 4~12 ; R<sup>7</sup> 가 ; C<sub>1</sub>~C<sub>20</sub> , C<sub>6</sub>~C<sub>20</sub> , 가 C<sub>1</sub>~C<sub>20</sub> ;

.] . R<sup>11</sup> -N(R<sup>11</sup>)- [ , R<sup>11</sup> ; C<sub>1</sub>~C<sub>4</sub> ; C<sub>1</sub>~C<sub>6</sub> ;

I , A<sup>1</sup> A<sup>2</sup> ; ; 가 ; 가 ; 가 ; 가 ; 가 ; 가 ;

C<sub>6</sub>~C<sub>40</sub> ; C<sub>1</sub>~C<sub>40</sub> ; 가 C<sub>7</sub>~C<sub>40</sub> ; C<sub>7</sub>~C<sub>40</sub> ; 가 (-CN); (-C(=O)-H); C<sub>2</sub>~C<sub>40</sub> ; (-C(=O)NH<sub>2</sub>); (-C(=O)-X, X); (-C(=O)-H);

(-CN); (-C(=O)NH<sub>2</sub>); (-C(=O)-X, X); (-C(=O)-H); (-C(=O)-X, X); (-C(=O)-H); (-C(=O)NH<sub>2</sub>); (-C(=O)-H);

A<sup>1</sup> A<sup>2</sup> 가 -C(=O)-B-C(=O)- [ , B ; -N(B<sup>1</sup>)- ( , B<sup>1</sup> , C<sub>1</sub>~C<sub>40</sub> ) ].

, A<sup>1</sup> A<sup>2</sup> 가

(B<sup>1</sup> ) . -C(=O)-O-C(=O)- , -C(=O)-N(B<sup>1</sup>)-C(=O)-

n<sub>1</sub> . n<sub>1</sub> 2 4 5 , , 가 .

가 가 . 가 가 .

, n<sub>1</sub>~2 , 3 , 4



가 5 가 7 (n 4

n 200 , 100 , 80 , 50 , 30 , 20  
 2 가 가 , 10 , n 가

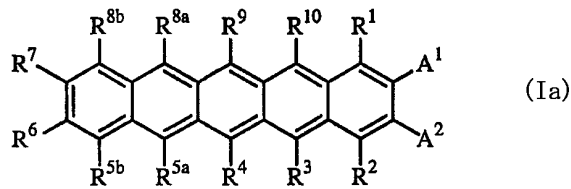
I , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup>가

I , R<sup>7</sup> A<sup>1</sup> A<sup>2</sup> R<sup>6</sup>가

1 , R<sup>3</sup>, R<sup>5</sup>, R<sup>8</sup> R<sup>10</sup> R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup> R<sup>9</sup> I , n  
 R<sup>3</sup> R<sup>10</sup>, R<sup>4</sup> R<sup>9</sup> 가 I , n

I , n 2 I la

[ la]



[ , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> ]

R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> 1

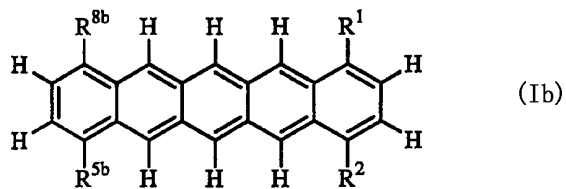
7, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup>가 n=1 R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup>가 R<sup>3</sup>, R<sup>4</sup>, R<sup>9</sup> R<sup>10</sup>, R<sup>1</sup>, R<sup>2</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, A<sup>1</sup> A<sup>2</sup>가 R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup> R<sup>9</sup> R<sup>10</sup>, R<sup>3</sup>, R<sup>5</sup>, R<sup>8</sup> R<sup>3</sup>, R<sup>5</sup>, R<sup>8</sup> R<sup>10</sup>, R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>9</sup>, A<sup>1</sup> A<sup>2</sup>가 R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>9</sup>, A<sup>1</sup> A<sup>2</sup>가

I n 2 (a'), (b'), (c') (d')

(a') la , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup>가 R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup> R<sup>10</sup>, R<sup>6</sup>, R<sup>7</sup>, A<sup>1</sup> A<sup>2</sup> 1 R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> 6 가

(b') lb

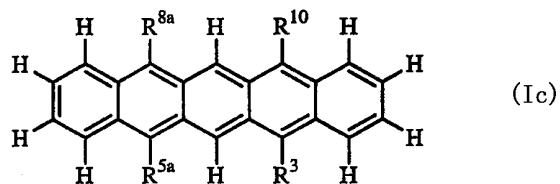
[ lb]



, R<sup>1</sup>, R<sup>2</sup>, R<sup>5b</sup>, R<sup>8b</sup> 가

(c') Ic

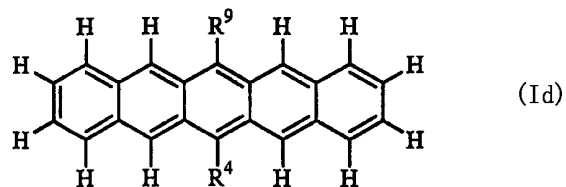
[ Ic ]



, R<sup>3</sup>, R<sup>5a</sup>, R<sup>8a</sup>, R<sup>10</sup>, R<sup>3</sup>, R<sup>5a</sup>, R<sup>8a</sup>, R<sup>10</sup>, R<sup>3</sup>, R<sup>5a</sup>, R<sup>8a</sup>, R<sup>10</sup>

(d') Id

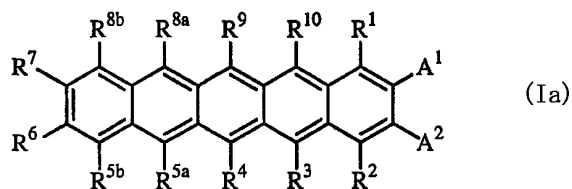
[ Id ]



, R<sup>4</sup>, R<sup>9</sup>

9, R<sup>10</sup>, A<sup>1</sup>, A<sup>2</sup>, 5, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>6</sup>, (化劑) (脫), R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup>, A<sup>2</sup> 가

[ Ia ]



[ R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup>, A<sup>2</sup> ] R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup>, A<sup>2</sup>, 5, 6, 7, 8, 9, 10

R<sup>6</sup>, R<sup>7</sup>, A<sup>1</sup> A<sup>2</sup>

R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>10</sup>, R<sup>4</sup>, R<sup>9</sup>, R<sup>5</sup>, R<sup>8</sup>,  
가

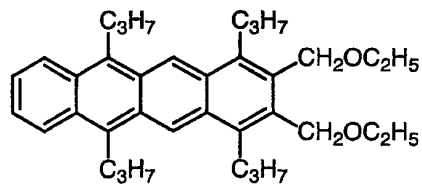
5a R<sup>8a</sup>, R<sup>5b</sup>, R<sup>8b</sup>, R<sup>6</sup>, R<sup>7</sup>, A<sup>1</sup> A<sup>2</sup>

R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>10</sup>, R<sup>4</sup>, R<sup>9</sup>, R<sup>8</sup>,  
가

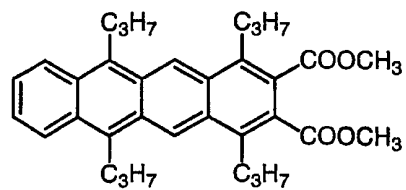
A<sup>2</sup>, R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup>, R<sup>9</sup>, R<sup>3</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>10</sup>

n<sup>1</sup>, A<sup>1</sup>, A<sup>2</sup>가  
n<sup>1</sup>, A<sup>1</sup>, A<sup>2</sup>가

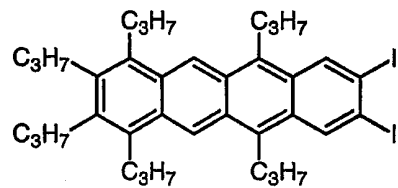
A<sup>2</sup>가, R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8b</sup>, R<sup>9</sup>, A<sup>1</sup>, A<sup>2</sup>, R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>3</sup>, R<sup>5a</sup>, R<sup>8a</sup>, R<sup>10</sup>



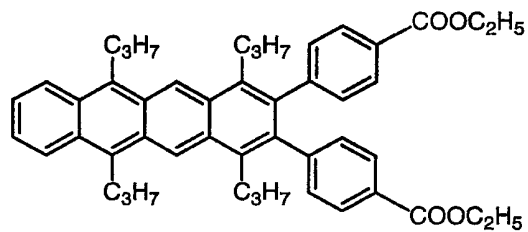
(화합물1)



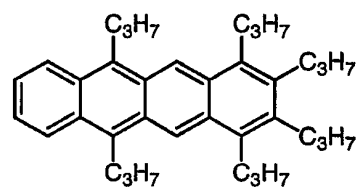
(화합물2)



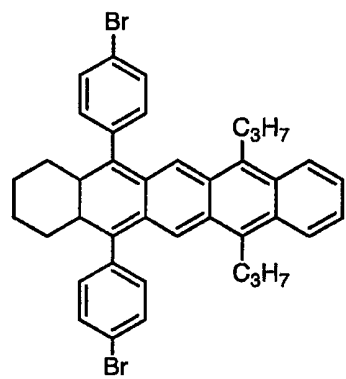
(화합물3)



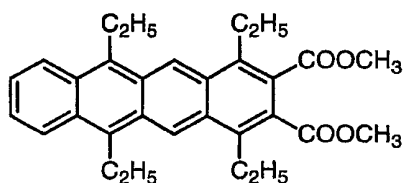
(화합물4)



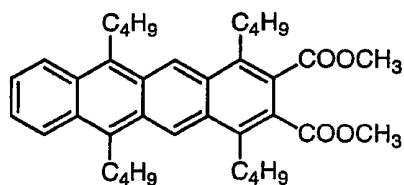
(화합물5)



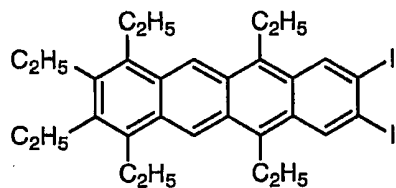
(화합물6)



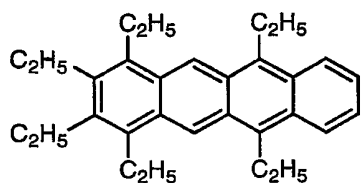
(화합물7)



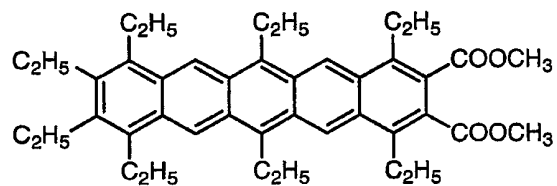
(화합물8)



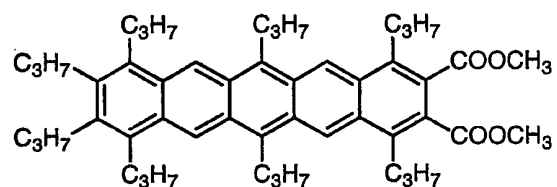
(화합물9)



(화합물10)



(화합물11)



(화합물12)

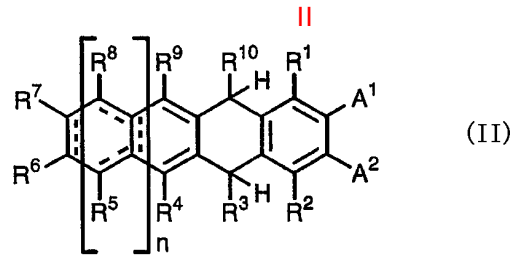
가

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|

||



[ , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup>, A<sup>2</sup> n .

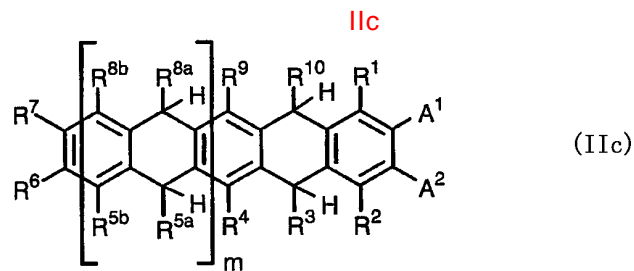
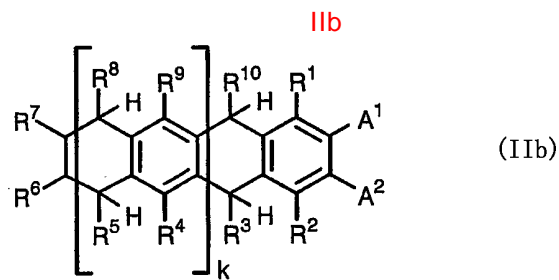
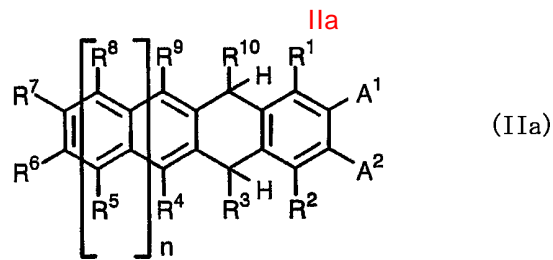
=====

]

II

가

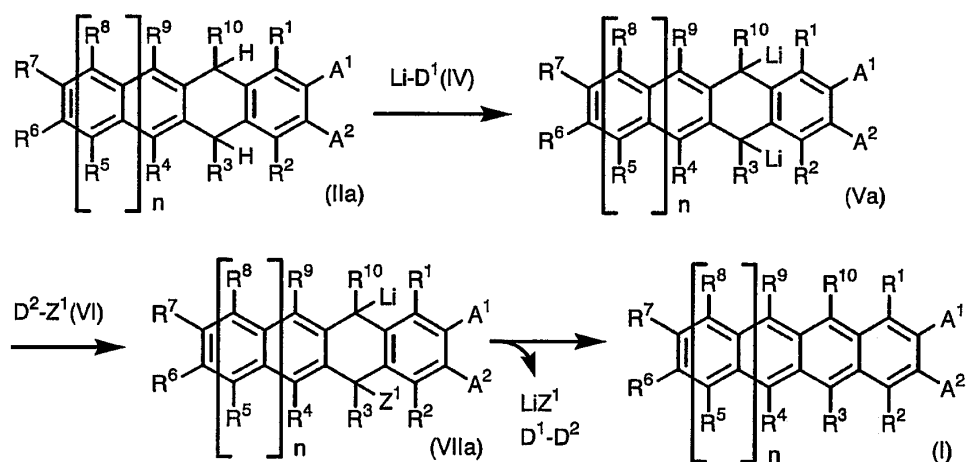
IIa, IIb IIc



[ R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup>, A<sup>2</sup> n ]

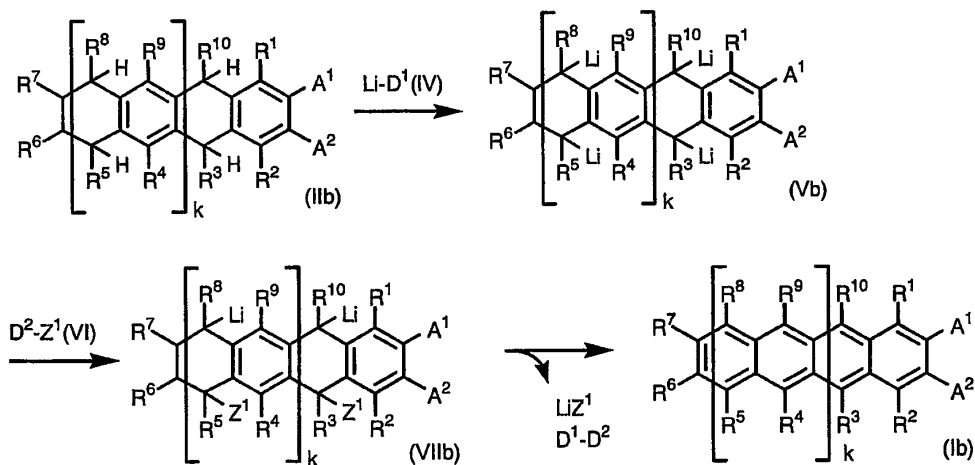
n, k (n+1)/2, II, 가 II, IIb, 가 II, c, m n/2, II, 가 II, Ica, IIa, 1, 가, IIb, I, 2, 가, II, 가, 가

IIa, IIb IIc



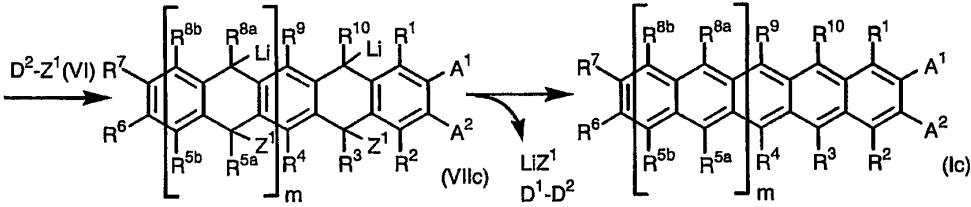
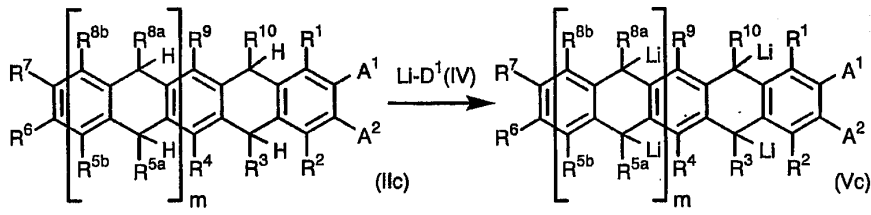
[ R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup>, A<sup>2</sup> n, D<sup>1</sup>, C<sub>1</sub>~C<sub>6</sub>, (求核基), D<sup>2</sup>, C<sub>1</sub>~C<sub>6</sub>, C<sub>1</sub>~C<sub>20</sub>, Z<sup>1</sup>, (離脫基), ]

IIa, R<sup>3</sup>, R<sup>10</sup>



[ R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup>, A<sup>2</sup> k, D<sup>1</sup>, C<sub>1</sub>~C<sub>6</sub>, D<sup>2</sup>, C<sub>1</sub>~C<sub>6</sub>, C<sub>1</sub>~C<sub>20</sub>, Z<sup>1</sup>, ]

IIb, R<sup>3</sup>, R<sup>5</sup>, R<sup>8</sup>, R<sup>10</sup>

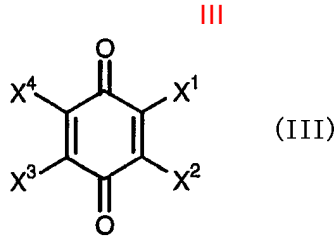


[ R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup>, A<sup>2</sup> m  
 C<sub>1</sub>~C<sub>6</sub> D<sup>2</sup> C<sub>1</sub>~C<sub>6</sub> C<sub>1</sub>~C<sub>20</sub> D<sup>1</sup>  
 Z<sup>1</sup> ]

IIc, R<sup>3</sup>, R<sup>5a</sup>, R<sup>8a</sup>, R<sup>10</sup>

IIa, Li-D<sup>1</sup> (IV)가  
 IIb, IIc 가  
 IIa, IIb, IIc (IV) Va, V  
 C<sub>20</sub> C<sub>1</sub>~C<sub>6</sub> C<sub>6</sub>~C<sub>20</sub> C<sub>1</sub>~  
 (IV) N,N,N',N'- (TMEDA) N,N,N',N'- 3  
 가 4 가 (配位) 3  
 가  
 0~200 가 , 20~100 가 , 30~80 가  
 VIIc Va, Vb Vc (VI) I, Ib Ic VIIa, VIIb  
 가 가 가 가  
 (VI) 가 6  
 (VI) (IV) (VI) 가 (IV)  
 가  
 IIa I , R<sup>1</sup>, R<sup>2</sup>,

R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup>, A<sup>2</sup> 가  
 R<sup>10</sup>, A<sup>1</sup>, A<sup>2</sup>, 6, 8, 50%, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>,  
 90%, 95%  
 I, III



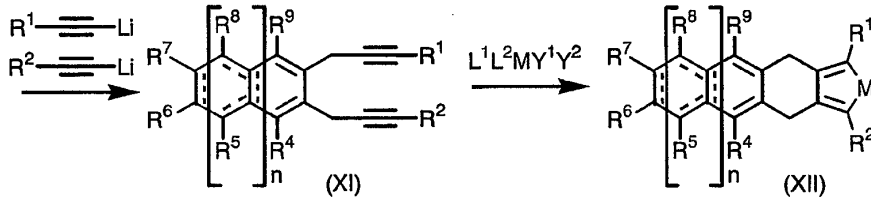
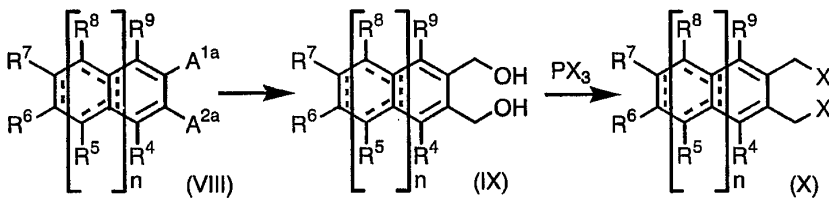
[ X<sup>1</sup>, X<sup>2</sup>, X<sup>3</sup>, X<sup>4</sup> ]  
 III II 1,4-  
 III 가 , 가 , 가 ,

X<sup>1</sup>, X<sup>2</sup>, X<sup>3</sup>, X<sup>4</sup> 가  
 X<sup>2</sup> 가 , X<sup>3</sup>, X<sup>4</sup> 가  
 X<sup>2</sup>, X<sup>3</sup>, X<sup>4</sup> 가 , 2,3- (chloranil) , X<sup>1</sup>,  
 , 2,3,5,6- -5,6- . X<sup>1</sup>,  
 III Diels-Alder 가 III 가

9~1.2 III , 0.9~1.15 , II 0.  
 , 0.95~1.05  
 가 ,  
 -80~200 가 , 0~100 가 , 10~80 가 .

I (擔持)  
 Pd/C 200~500

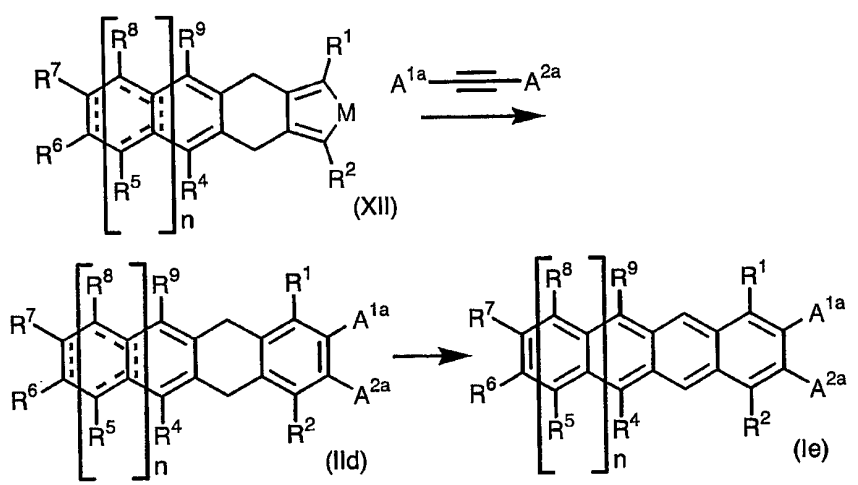




[ R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup> 가 C<sub>6</sub> ~ C<sub>40</sub> 가, A<sup>1a</sup>, A<sup>2a</sup> C<sub>6</sub> ~ C<sub>40</sub> X

-----

M 3~5 (lanthanide);  
 L<sup>1</sup>, L<sup>2</sup> , L<sup>1</sup>, L<sup>2</sup> 가  
 ;  
 Y<sup>1</sup>, Y<sup>2</sup> , .]



1  
 ,  
 / ,  
 / ,  
 (1 ) 가  
 1 ,  
 가

(A) / / / /  
( 1), (B) / / / / /  
( 3), (D) / / / / / ( 2), (C) / / / /  
( 5) 가 (E) / / / / / 가  
( 1) 가 (D) 가 (F) 1  
( 6), (G) 1  
( 7), (H) 1  
( 8)가

(H) (A) (B) (C) (E) (F) (G)  
(A) (B) (C) (F) (G)  
( 1) 1 2 3 4 5  
, 6 , 7

(1) (支持)  
(誘電體) 가  
(2) (work function)가  
, ITO( (Indium) (Tin) (Oxide)), (sp  
uttering)  
5~1000 nm 5~50 /  
10~500 nm

(3) ( )  
( -N- ) 1  
[N- -N-(4'- ) ] , 4,4'- [N- -N-(3'- ) ] ( , 4,4'-  
-N-(3'- ) ] , 4,4'- [N- -N-(1'- ) ] , 3,3'- -4,4'-  
[N- -N-(3'- ) ] , 1,1- [4'-[N,N- (4'- ) ] ] , 9,  
10- [N-(4'- )-N-(4'-n- ) ] , 3,8- (N,N- )-6-  
, 4- -N,N- [4',4''- [N',N'- (4- ) ] -4- ] , N,N'- [4-(  
) ] -N,N'- -1,3- , N,N'- [4-(  
) ] -N,N'- -1,4-  
, 5,5'- [4-( [4- ] ) ] -2,2':5',2'- (terthiophene), 1,3,5- (  
) , 4,4',4'- (N- ) , 4,4',4'- [N-(3''- )-N- ]  
, 4,4',4'- [N,N- (4''-tert- -4''- ) ] , 1,3,5- [N-(4'-  
)-N- ] , -N- 가

1~99 % , 0.1 % , 0.1~99.9 % ,  
5~95 % .

(4)

(anthracene), (tetracene), (pyrene), (perylene), (chrysene), (rubrene (de  
cacyclene), (coronene), (9'- , 4,4'- (9'- , 9,10- , 9,10-  
( , 1,4- (8- , (10- [h] , 2-(2'- ) , [ ,  
[ ( , ( , 4- , 3- (hyd  
roxyflavone) , 5- , 5- , ) , [ ,  
, 1,1,4,4- -1,3- , 4,4'- (2,2- ) , 4,4'- [(1,1,2- ) ]  
] , [ , 1, 6, 7, 30, 106, 138, 151,  
152, 153, 307, 311, 314, 334, 338, 343, 500] ,  
[ , DCM1, DCM2] , [ (Nile red) ] ,  
(cinnamic acid) , -N-  
) , 1 .

0.1~99.9 % 0.001~99.999 % , 0.01~99.99 % ,

가 , J. Appl. Phys., 65, 3610(1989), ( )5-214332  
가 가

40 % , 0.01~30 % , 0.1~20 % 0.001~

,10- , 9,10- ( ) , 1,4- (9'- ) , 4,4'- (9'- , 9

0.001~40 % , 0.01~30 % , 0.1~20 %

가 , 8- (a)~ (c) 가

(Q)3-AI (a)

[ , Q 8- ]

(Q)2-AI-O-L (b)



가 (singlelet oxygen) (quencher)

가

( )

0.05~30 %, ( 0.1~20 % ) 0.01~50 %

(塗布) (Lang

muir-Blodgett) ( )

,  $10^{-5}$  Torr 50~600 (

), -50~300 0.005~50 nm/sec

) (共蒸着

(binder)

-N-

(

, 1-

, 1- -2- , 1,3- -2- N,N- , N,N-

) /

(paint shaker), (attritor), (homogenizer) (ball mill), (sand mill),

0.1~50 % , 1~30 %

(1 ) 5~99.9 % , 10~99

% , 15~90 %

(封止層)

(封入)

(

), ( ) (amorphous)

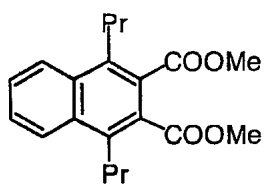
가

1

가 , ( , ),  
 ( , ), / , 가 ,  
 가 .

가 2~30 V .

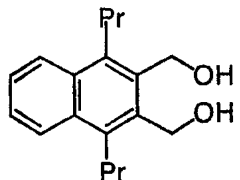
1



1,4- -2,3-

2,3- -5,6- (1.362 g, 6.0 mmol) 1,4- -5,6,7,8-  
 2,3- (0.665 g, 2.0 mmol) (20 ml) 가 , 24  
 0.464 g . GC 87%. (單離) 71% ( / , 1/20)

2



2,3- ( )-1,4-

1

1,4-

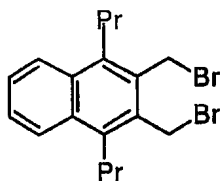
-2,3-

0

가 ,  
 , 0.219 g(0.898 mmol)

90%.

3



2,3- ( )-1,4-

2

2,3-

(

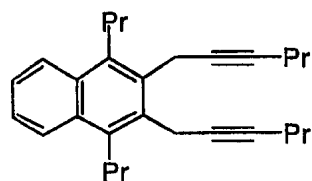
)-1,4-

(1 eq)

가

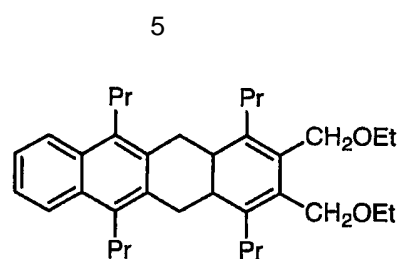
1

/ , 1/50) 0.115 g(0.4 mmol) (殘渣) 72% (



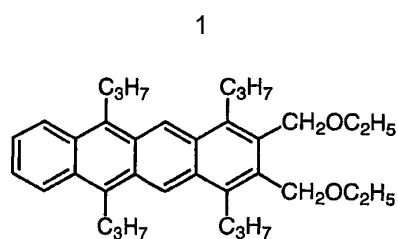
2,3- (2- )-1,4-

(DMPU) 3 2,3- ( )-1,4- 1 THF N,N'- 가  
 mol) 93% ( / , 1/50) 1.661 g(4.787 m



5,12- -1,4,6,11- -2,3-

4 2,3- (2- )-1,4- -78 ( 5 - )  
 NiCl<sub>2</sub>(PPh<sub>3</sub>)<sub>2</sub> THF 가 , 1 가 1 , 3 N  
 가 1,4- -2- 가 가  
 / , 1/10) (

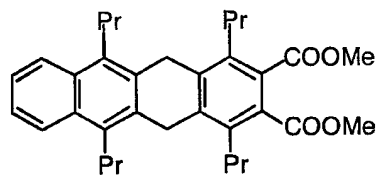


(화합물1)

2,3- ( )-1,4,6,11-

5 5,12- -1,4,6,11- -2,3- . 2,3-  
 -5,6- (0.050 g, 0.22 mmol) 1,4- (5 ml) 5,12- -1,4,6,11-  
 -2,3- (0.2 mmol) 가 , 3 /

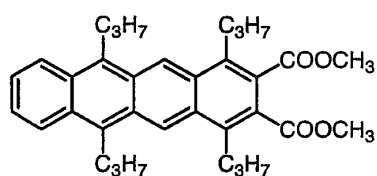
6



5,12- -1,4,6,11- -2,3-

4 THF 2,3- (2- )-1,4- -78 ( 5 - )  
 CuCl 가 , 가 가 1 , 3 N  
 / , 1/10) 1.790 g(4.458 mmol) 78%.

2

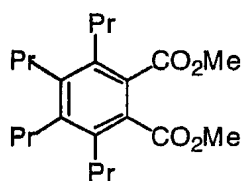


(화합물2)

2,3- ( )-1,4,6-11-

6 5,12- -1,4,6,11- -2,3- (5 ml) 5,12- -1,  
 . 2,3- -5,6- (0.050 g, 0.22 mmol) 1,4- (0.103 g, 0.2 mmol) 가 , 3  
 4,6,11- -2,3- (5 ml) 가 가  
 / 0.076 g (針)

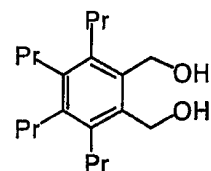
7



3,4,5,6-

( 5 - ) (7.016 g, 24.0 mmol) n- (31.6 ml, 48.0 mmol, 1.52 M  
 ) ( 5 - ) THF 70 ml , 4- (5.9 ml, 40.0 mmol)  
 -78 가 . 1 . DMAD( 가 . 1 , 3 N HCl  
 )(7.4 ml, 60.0 mmol) CuCl(3.96 g, 40.0 mmol)  
 가 . GC 82%. 74%.

8

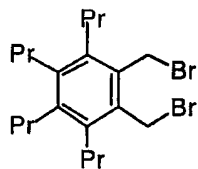




1,2- ( )-3,4,5,6-

LiAlH<sub>4</sub> (1.20 g, 31.7 mmol) 50 ml THF 7 3,4,5,6-  
 (5.22 g, 14.4 mmol) 0 가 . 1 , 가 2 N H<sub>2</sub>  
 SO<sub>4</sub> , (3.67 g) . 91%.

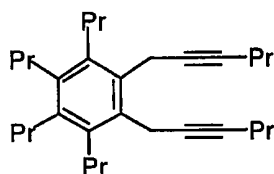
9



1,2- ( )-3,4,5,6-

(0.54 ml, 5.70 mmol) 8 1,2- ( )-3,4,5,6-  
 (1.75 g, 5.70 mmol) 20 ml (滴下) . 1 ,  
 . GC 100%. 87% (1.866 g)

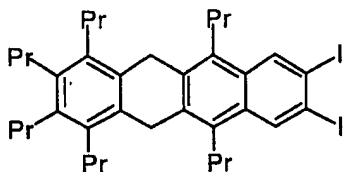
10



1,2- (2- )-3,4,5,6-

1- (1.67 ml, 17.12 mmol) 30 ml THF , n- (9.7 ml, 15.56 mmol, 1.6 M) -78 가  
 1.68 g, 3.89 mmol) DMPU(1.9 ml, 15.56 mmol) 1,2- ( )-3,4,5,6- ( )  
 가 . 1 , 3 N HCl , (1.520 g) . G  
 C 100%. 97%.

11

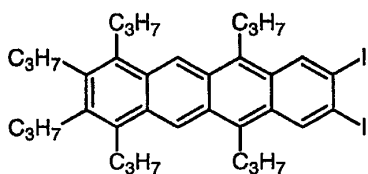


6,11- -2,3- -5,7,8,9,10,12-

n- (3.0 ml, 4.8 mmol, 1.6 mol/l) Cp<sub>2</sub>ZrCl<sub>2</sub> (0.702 g, 2.4 mmol) THF(20 ml) -78 가  
 13 g, 2.0 mmol) 가 (cooling bath) 1,2- (2- )-3,4,5,6- (0.8  
 .16 g, 2.0 mmol) DMPU(0.73 ml, 6.0 mmol), CuCl(0.416 g, 4.2 mmol) 가 . 50 1  
 , 3 N HCl 가 , ,

(0.477 g) . 33%.

3

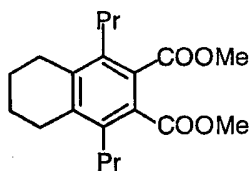


(화합물3)

8,9- -1,2,3,4,6,11-

ol) 2,3- 11 6,11- -5,7,8,9,10,12- -2,3- (0.238 g, 0.324 mmol) 가 .  
 / 3 -5,6- (0.081 g, 0.35 mmol), 1,4- (2 ml) 가 .  
 (0.081 g) . 34%.

12

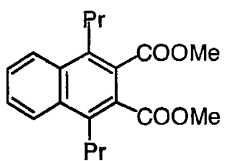


1,4- -5,6,7,8- -2,3-

( 5 - ) (16.849 g, 57.64 mmol) n- (75.8 ml, 115.3 mmol, 1.5  
 2 M) ( 5 - ) 200 ml THF , 4,10- (9.1  
 4 g, 48.03 mmol) -78 가 . 1 . DMAD(17.4 ml, 1  
 44.01 mmol) CuCl(9.51 g, 96.06 mmol) 가 . 1 , 3 N HCl 가

(8.133 g) . GC 58%. 51%.

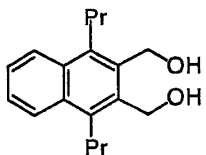
13



1,4- -2,3-

2,3- -5,6- (1.362 g, 6.0 mmol) 12 1,4- -5,6,  
 7,8- -2,3- (20 ml)(0.665 g, 2.0 mmol) 가 . 2  
 4 . (0.464 g) . GC 87%. 71%.

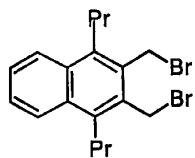
14



2,3- ( )-1,4-

LiAlH<sub>4</sub> (0.075 g, 1.98 mmol) 5 ml THF  
 (0.295 g, 0.898 mmol) 0 가 13 1,4- -2,3  
 2 N H<sub>2</sub> SO<sub>4</sub> (0.219 g) , 가 , 90%.

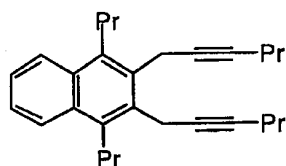
15



2,3- ( )-1,4-

(0.04 ml, 0.42 mmol) 14 2,3- ( )-1,4-  
 (0.109 g, 0.40 mmol) 5 ml . 1 ,  
 (0.115 g) .  
 72%.

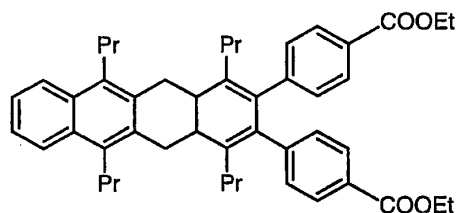
16



2,3- (2- )-1,4-

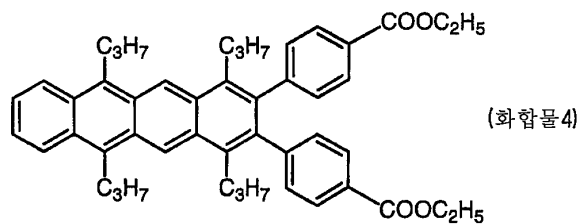
1- (2.05 ml, 21.06 mmol) 30 ml THF , n- (7.6 ml, 19.1 mmol, 2.52 M) -78 가  
 1 g, 4.79 mmol) 1 DMPU(2.3 ml, 19.1 mmol) 15 2,3- ( )-1,4- (1.9  
 가 . 1 , 3 N HCl  
 (1.66 g) . 93%.

17



2,3- ( )-5,12- -1,4,6,11-  
 ( 5 - ) (0.351 g, 1.2 mmol) n- (1.5 ml, 2.4 mmol, 1.6 M)  
 ( 5 - ) 20 ml THF , 16 2,3- (2  
 )-1,4- (0.373 g, 1.0 mmol) -78 가 . 1  
 ( 24 ) (1.5 mmol) NiBr<sub>2</sub>(PPh<sub>3</sub>)<sub>2</sub> (0.892 g, 1.2 mmol)  
 가 . 24 , 3 N HCl 가 .

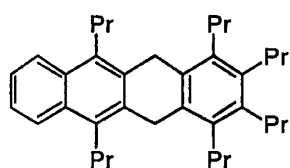
4



2,3- (4- )-1,4,6,11-

mmol) 17 2,3- ( )-5,12- -1,4,6,11- (1.04  
24 -5,6- (0.260 g, 1.14 mmol), 1,4- (3 ml) 가 .  
/ , ,

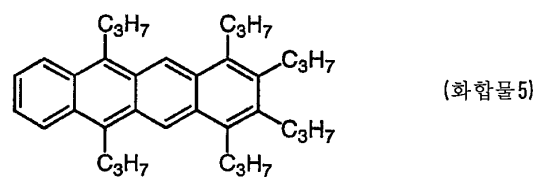
18



5,12- -1,2,3,4,6,11-

( 5 - ) (0.351 g, 1.2 mmol) n- (1.5 ml, 2.4 mmol, 1.6 M)  
( 5 - ) 20 ml THF , 16 2,3- (2  
- )-1,4- (0.373 g, 1.0 mol) -78 가 .  
.4- (0.22 ml, 1.5 mmol) NiBr<sub>2</sub> (PPh<sub>3</sub>)<sub>2</sub> (0.892 g, 1.2 mmol) 가  
.24 , 3 N HCl 가 .  
(粉末化) (0.224 g) . 46%.

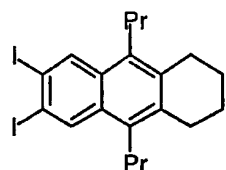
5



1,2,3,4,6,11-

-5,6- 18 5,12- -1,2,3,4,6,11- (0.503 g, 1.04 mmol) 2,3-  
(0.260 g, 1.14 mmol), 1,4- (3 ml) 가 . 24  
(0.112 g) . NMR 36%. 22%.  
/

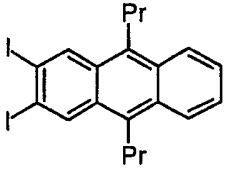
19



9,10- -2,3- -5,6,7,8-

( 5 - ) (0.175 g, 0.6 mmol) THF(25 ml) , -78 n-  
 (0.75 ml, 1.2 mmol, 1.6 mol/l) 가 . 1 1 4,10- (0.095 ml, 0.5  
 mmol) 가 . 1 (0.582 g, 1.0 mmol) D  
 MPU(0.18 ml, 1.5 mmol), CuCl(0.104 g, 1.1 mmol) 가 . 50 1 , 3 N  
 가 . (0.1  
 48 g) . 57%.

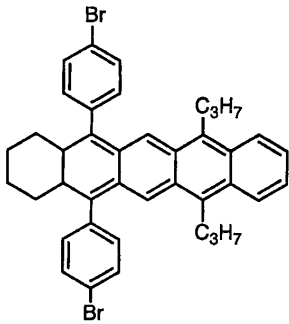
20



9,10- -2,3-

19 9,10- -2,3- -5,6,7,8- (0.259 g, 0.5 mmol) 2  
 ,3- -5,6- (0.341 g, 1.5 mmol), 1,4- (3 ml) 가 . ,  
 1 ( ) (0.109 g) . 42%.

6

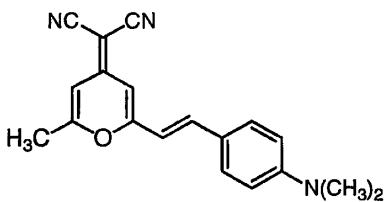


(화합물6)

5,14- (4- )-1,2,3,4- -7,12-

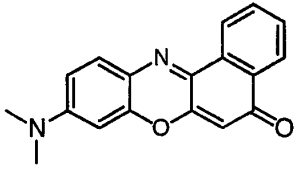
( 5 - ) (0.161 g, 0.551 mmol) n- (0.7 ml, 1.6 M, 1.1 mmol)  
 ( 5 - ) ) THF , 1,8- (p- )-1,7- (0.  
 191 g, 0.459 mmol) -78 가 . 1 . CuCl(0.095 g, 0.964 mmol)  
 DMPU(0.17 ml, 1.38 mmol), 20 2,3- -9,10- (0.236 g, 0.459  
 mmol) 가 . 50 1 가 ,  
 ( ) / (0.177 g)  
 . 57%.

1



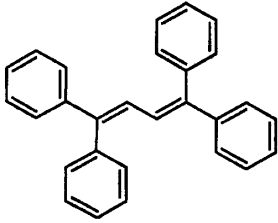
(비교화합물1)

2



(비교화합물2)

3



(비교화합물3)

1

130 nm ITO ( ) , , , , 10<sup>-6</sup> Torr I  
 TO 가 , UV/ TPD[N,N'-(3- )-N,N'- ] 30 nm , 4  
 0 nm 1 Alq. [ (8- ) ] 1:100  
 ( , Alq. 20 nm , 150 nm ( 10:1)  
 EL 5 mm×5 mm) , EL KEITHLEY 2400  
 가 TOPCON BM-9 (Hamamatsu Photonic  
 s) PMA-11 1

[ 1 ]

	최고 휘도 (cd/m <sup>2</sup> )	구동전압 (V)	발광파장 (nm)
본 발명 화합물1	2100	11	520
본 발명 화합물2	2000	12	525
본 발명 화합물4	2600	13	520
본 발명 화합물5	2700	13	520
본 발명 화합물6	2800	14	525
비교 화합물1	1400	14	600
비교 화합물2	320	15	570

2

1 ITO ITO 10<sup>-6</sup> Torr  
 ITO TPD[N,N'-(3- )-N,N'- ] 30 nm,  
 2 40 nm, Alq. [ (8- ) ] 60 nm  
 , 1 가 2

[ 2 ]

	최고 휘도 ( $\text{cd}/\text{m}^2$ )	구동전압 (V)
본 발명 화합물1	2 4 0 0	1 2
본 발명 화합물2	2 2 0 0	1 1
본 발명 화합물4	2 8 0 0	1 3
본 발명 화합물5	3 0 0 0	1 3
본 발명 화합물6	3 2 0 0	1 2
비교 화합물1	1 1 0 0	1 3

PVK [ (N- ) ] 21 mg, PBD [2-(4- )-5-(4-tert- )-1,3,4- ] 9 mg, IT  
 O 가 3 1 mg 1,2- 3 ml , 1 (150 nm) IT  
 60 nm , 1

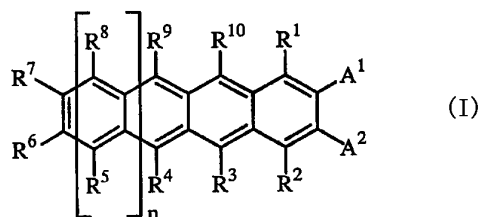
[ 3 ]

	최고 휘도 ( $\text{cd}/\text{m}^2$ )	구동전압 (V)	발광파장 (nm)
본 발명 화합물1	1 2 0 0	1 5	5 1 5
본 발명 화합물2	1 1 0 0	1 6	5 2 5
본 발명 화합물3	1 2 0 0	1 6	5 4 0
본 발명 화합물4	1 3 0 0	1 7	5 2 0
본 발명 화합물5	1 4 0 0	1 6	5 2 0
본 발명 화합물6	1 1 0 0	1 6	5 3 0
비교 화합물1	7 0 0	1 6	6 0 0
비교 화합물3	6 8 0	1 6	4 8 0

(57)

1.

< |>



[ , R 1 , R 2 , R 3 , R 4 , R 5 , R 6 , R 7 , R 8 , R 9 R 10 ,

; 가 C<sub>1</sub>~C<sub>40</sub>; 가 C<sub>1</sub>~C<sub>40</sub>,  
 가 C<sub>6</sub>~C<sub>40</sub>, R<sup>6</sup> R<sup>7</sup>; 가 C<sub>4</sub>~C<sub>40</sub>,  
 , (-N(R<sup>11</sup>))- (R<sup>11</sup>)  
 .)

A<sup>1</sup> A<sup>2</sup>; 가 C<sub>1</sub>~C<sub>40</sub>; 가 C<sub>6</sub>~C<sub>40</sub>,  
 C<sub>40</sub>; 가 C<sub>7</sub>~C<sub>40</sub>; 가 C<sub>2</sub>~C<sub>40</sub>,  
 H<sub>2</sub>); (-C(=O)-X, X); (-CN); (-C(=O)N  
 =O)- (B); (-C(=O)-H); (-C(=O)-B-C  
 , C<sub>1</sub>~C<sub>40</sub> , (B<sup>1</sup>), (-N(B<sup>1</sup>)- (B<sup>1</sup>))

n 1, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> 가

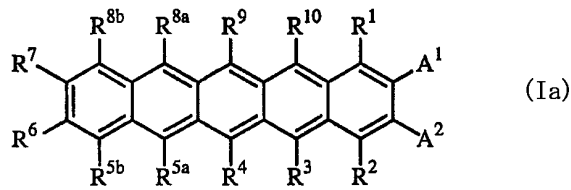
R<sup>7</sup> A<sup>1</sup>, A<sup>2</sup> R<sup>6</sup> 가

n 1, R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup> R<sup>9</sup>, R<sup>3</sup>, R<sup>5</sup>, R<sup>8</sup> R<sup>10</sup>

R<sup>3</sup> R<sup>10</sup>, R<sup>4</sup> R<sup>9</sup> 가

n 2 I Ia

< Ia >



(A<sup>1</sup> A<sup>2</sup>, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup> R<sup>10</sup> 가 C<sub>1</sub>~C<sub>40</sub>, 가 C<sub>6</sub>~C<sub>40</sub>, R<sup>6</sup> R<sup>7</sup> 가 C<sub>4</sub>~C<sub>40</sub>, (-N(R<sup>11</sup>))- (R<sup>11</sup>)).

R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> 1 .]

2.

1, I, n=1 2,

n 1, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> 가 R<sup>3</sup>, R<sup>4</sup>, R<sup>9</sup>, R<sup>10</sup>, R<sup>1</sup>, R<sup>2</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, A<sup>1</sup> A<sup>2</sup> 가 R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup> R<sup>9</sup>, R<sup>3</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>10</sup>, A<sup>1</sup> A<sup>2</sup> 가



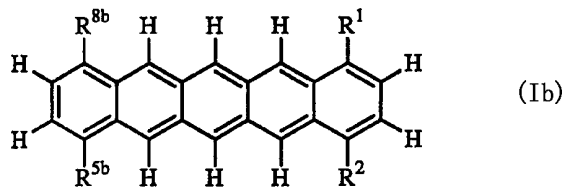
, R<sup>3</sup>, R<sup>5</sup>, R<sup>8</sup>, R<sup>10</sup>, R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>9</sup>, A<sup>1</sup>, A<sup>2</sup>가

, n 2 la ,

la , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup>, A<sup>2</sup>가  
 , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, R<sup>6</sup>, R<sup>7</sup>, A<sup>1</sup>, A<sup>2</sup>, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5a</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8a</sup>, R<sup>8b</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup>, A<sup>2</sup> 6 가

lb ,

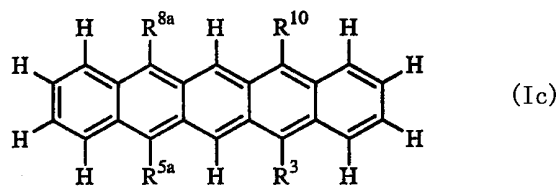
< lb>



[ , R<sup>1</sup>, R<sup>2</sup>, R<sup>5b</sup>, R<sup>8b</sup>가 .]

lc

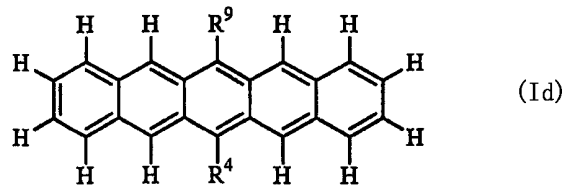
< lc>



[ , R<sup>3</sup>, R<sup>5a</sup>, R<sup>8a</sup>, R<sup>10</sup> 2 , R<sup>3</sup>, R<sup>5a</sup>, R<sup>8a</sup>, R<sup>10</sup> 1 .]

ld

< ld>



[ , R<sup>4</sup>, R<sup>9</sup> , , , , .]

3.

1 2 , R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>10</sup>, A<sup>1</sup>, A<sup>2</sup> 5

4.

1 2 , R 1 , R 2 , R 3 , R 4 , R 5 , R 6 , R 7 , R 8 , R 9 , R 10 , A 1 A 2 6

5.

1 2 , 가 la , R 1 , R 2 , R 3 , R 4 , R 5a , R 5b , R 6 , R 7 , R 8a , R 8b , R 9 , R 10 , A 1 A 2 5

6.

5 , R 1 , R 2 , R 3 , R 4 , R 5a , R 5b , R 6 , R 7 , R 8a , R 8b , R 9 , R 10 , A 1 A 2 6

7.

5 , R 1 , R 2 , R 3 , R 4 , R 5a , R 5b , R 6 , R 7 , R 8a , R 8b , R 9 , R 10 , A 1 A 2 7

8.

5 , R 1 , R 2 , R 3 , R 4 , R 5a , R 5b , R 6 , R 7 , R 8a , R 8b , R 9 , R 10 , A 1 A 2 8

9.

5 , R 1 , R 2 , R 3 , R 4 , R 5a , R 5b , R 6 , R 7 , R 8a , R 8b , R 9 , R 10 , A 1 A 2 9

10.

5 , R 1 , R 2 , R 3 , R 4 , R 5a , R 5b , R 6 , R 7 , R 8a , R 8b , R 9 , R 10 , A 1 A 2 10

11.

1 4 , R 1 R 2 , R 3 R 10 , R 4 R 9 , R 5 R 8 , R 6 R 7 , A 1 A 2

12.

5 10 , R 1 R 2 , R 3 R 10 , R 4 R 9 , R 5a R 8a , R 5b R 8b , R 6 R 7 , A 1 A 2

13.

1 4 , R 1 , R 2 , R 3 , R 4 , R 5 , R 6 , R 7 , R 8 , R 9 R 10  
 가 가 C 1 ~C 40 ; 가 C 1 ~C 40 ,  
 가 가 C 6 ~C 40

14.

5 10 , R 1 , R 2 , R 3 , R 4 , R 5a , R 5b , R 6 , R 7 , R 8a , R 8b , R 9 R  
 10 가 가 C 1 ~C 40 ; 가 C 1 ~C 40 ,  
 , 가 가 C 6 ~C 40

15.

1 , R 1 , R 2 , R 4 R 9 , 가 C  
 1 ~C 40 가 C 6 ~C 18 ;  
 A 1 A 2 , 가 C 2 ~C 40 ;  
 n 1

16.

1 , A<sup>1</sup>, A<sup>2</sup>, R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup> R<sup>9</sup> 가 C<sub>1</sub>~C<sub>40</sub> C<sub>6</sub>~C<sub>18</sub> ; , 가  
n 1 .

**17.**  
1 , R<sup>3</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup> R<sup>10</sup> 가 C<sub>1</sub>~C<sub>40</sub> C<sub>6</sub>~C<sub>18</sub> ; , 가  
A<sup>1</sup> A<sup>2</sup> , ;  
n 1 .

**18.**  
1 2 , 가 la , A<sup>1</sup> A<sup>2</sup>  
2 가 가 C<sub>2</sub>~C<sub>40</sub> R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8b</sup>  
R<sup>9</sup> 가 C<sub>1</sub>~C<sub>40</sub> 가 C<sub>6</sub>~C<sub>18</sub>

**19.**  
1 2 , 가 la , A<sup>1</sup>, A<sup>2</sup>  
, R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup>, R<sup>5b</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8b</sup> R<sup>9</sup> 가 C<sub>1</sub>~C<sub>40</sub>  
가 C<sub>6</sub>~C<sub>18</sub> .

**20.**  
1 2 , 가 la , A<sup>1</sup> A<sup>2</sup>  
2 가 가 R<sup>3</sup>, R<sup>5a</sup>, R<sup>8a</sup> R<sup>10</sup> 가 C<sub>1</sub>~C<sub>40</sub>  
가 C<sub>6</sub>~C<sub>18</sub> .

**21.**  
1 20 1

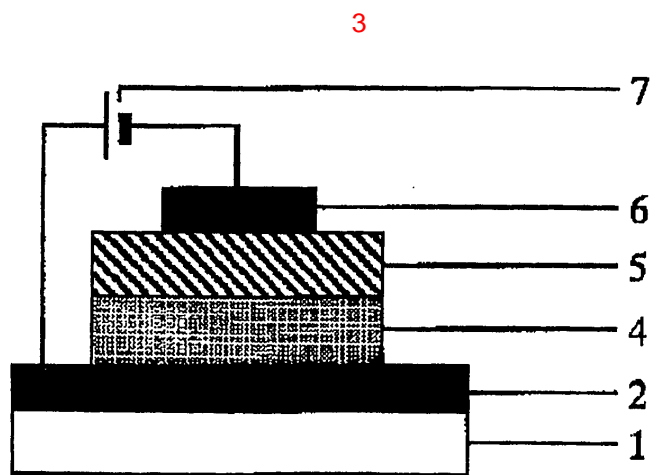
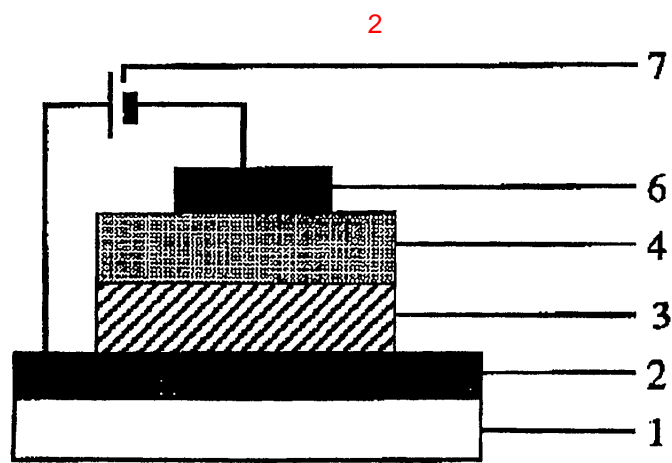
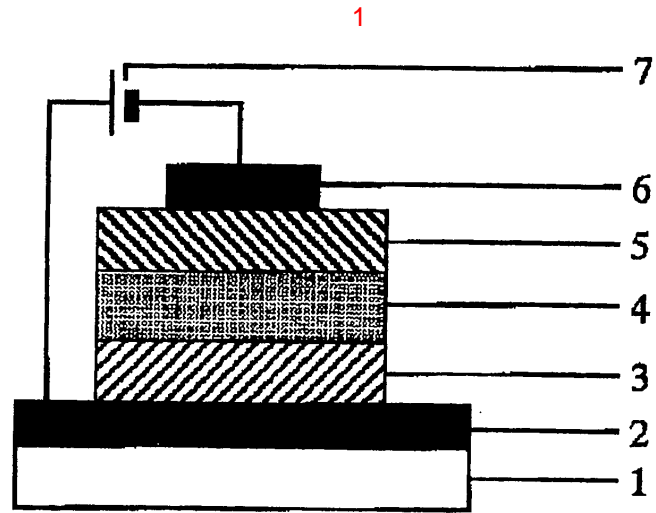
**22.**  
21 , 1 .

**23.**  
21 , 1 .

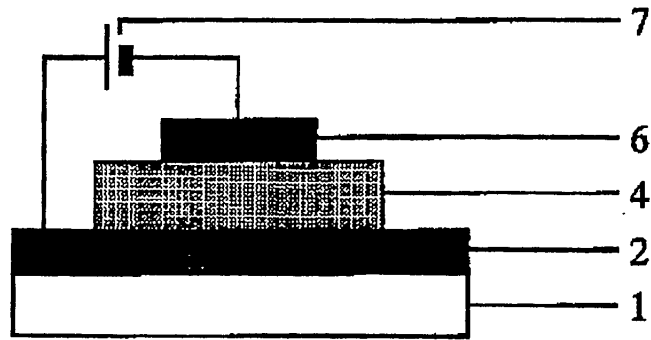
**24.**  
21 , 1 .

**25.**  
21 24 , 가 ,  
1

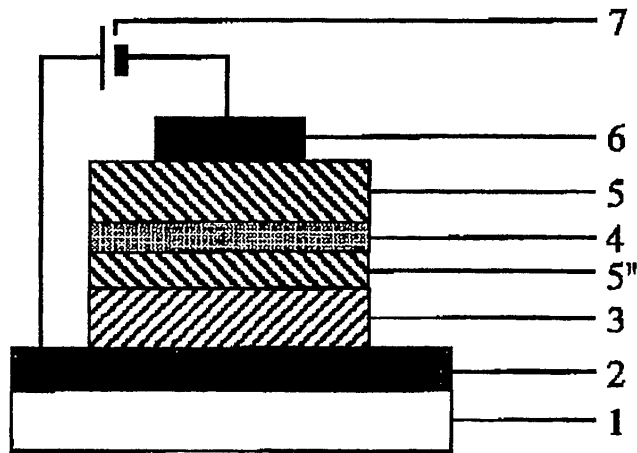
**26.**  
21 25 , 1 20  
0.1~40 %



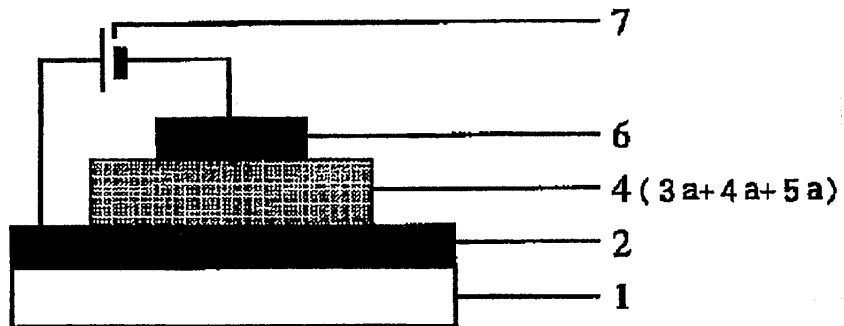
4



5



6



7

