



(74)

:

(54)

OVP

OVP

2

(視變色)

가

(OVI™)

(feature) 1987

OVP (OVP) 가

- (Fabry - Perot) 1 OVP

OVP

( )

/

20 30 μm,

1 μm

OVP

가 . , ,

2 OVP  
(CVD) , 2

OVP 1 2 가가 , 1

가 .

" " " (暈色)" 가 ( , , ) , " O

VP" " OVP" 가 . 가

가 , OVP OVP OVP " OVP"

; iii) ; iv) " / " ; ii) 가

OVP 4,838,648 OVP ( ) - - ( ) OVP ,

80:20 (i) ,

4,838,648 , (ii) 가 , 가

1 OVP OVP

2 OVP OVP

3 가 OVP

4 가 가 " " OVP OVP

, 1 OVP , 1 OVP 1

OVP 1 , OVP가 .

OVP 2 , OVP가 .

OVP 가 , OVP OVP 가 .

/ 가 .

1 5 OVP .  
 2 OVP 1 . 7 가  
 3 OVP 2 . 4 가

1 5 1 OVP 20 30  $\mu\text{m}$ , 1  $\mu\text{m}$   
 / / " (1,1') , / / ( ,  
 3 5 nm) (2,2') (2,2') 가  
 (MgF<sub>2</sub>; n=1.38) , 200 800 nm ( , : 440 nm MgF<sub>2</sub> ,  
 : 385 nm MgF<sub>2</sub> ) . OVP (3) ,  
 , 10 100 nm .

2 OVP 1 OVP  
 (1,1'), (2,2') (3,3') 1  
 (4) (3,3') " / / / / / / / " .  
 7

3 OVP 2 OVP 1  
 (1), 1 (2) 1 (4) 1 (4)  
 4 가 . (R) (C) , (1)  
 , (2) (3) .  
 (4) .

(4)  $Fe_2O_3, Fe_3O_4, CrO_2, MFe_2O_4$  (M:  $Mg^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, Mn^{2+}, Ni-Co, Nd-Fe-B; A_3B_5$ ),  $MFe_{12}O_{19}$  (M:  $Al^{3+}, Cr^{3+}, Fe^{3+}, Ga^{3+}, Bi^{3+}$ ),  $Ca^{2+}, Sr^{2+}, Ba^{2+}$ ),  $Co^{2+}, Fe^{2+}, Ni^{2+}, Cu^{2+}, Zn^{2+}$ , B,  $Al^{3+}, Cr^{3+}, Fe^{3+}, Ga^{3+}, Bi^{3+}$ ),  $A_3B_5$ ,  $O_{12}$  (A: 3가, B: 2가),  $Ca^{2+}, Sr^{2+}, Ba^{2+}$ )

OVP ( ) ; ; ; ;

0 10,000

1 OVP  $MgF_2$

(Neel) (Curie) 가 e-

(4) ( , , , , ) (3,3')

OVP가 -OVP가

가 OVP

(hot stamping) (cold stamping) 가

3

(EAS)

가 OVP 가 OVP

OVP

7 OVP 4 OVP 5 OVP

OVP 1 가

(4)

가 , OVP , (證印), , ,

2 OVP 1 , (4) OVP (3,3')  
 , " " OVP / /  
 , 가 . " " ,

(R) (C) , 1 (1) ,  
 1 (2) 1 (3) , (4)  
 (2') 2 (1') OVP 2  
 ( , , , ); ( , - , - , - ,  
 - - ); ( , , , , , ,  
 )

1. OVP  
 OVP 1 , 7 (R) (C)

1. , 3.5 nm [ 1 (1)]

2. MgF<sub>2</sub>, 385 nm [ 1 (2)]

3. , 40 nm [ 1 (3)]

4. , 200 nm [ (4)]

5. , 40 nm [ 2 (3')]

6. MgF<sub>2</sub>, 385 nm [ 2 (2')]

7. , 3.5 nm [ 2 (1')]

: 530 nm

, (C)

OVP 1 , (4)

OVP 1 , (4)  
 , 214 MHz

- OVP 16 1 , (4) 가 가
2. OVP
- OVP 1 EAS (R) Fe<sub>50</sub>Co<sub>25</sub>Si<sub>10</sub>B<sub>15</sub> (C)
- 7
1. , 3.5 nm [ 1 (1)]
  2. MgF<sub>2</sub>, 440 nm [ 1 (2)]
  3. , 40 nm [ 1 (3)]
  4. Fe<sub>50</sub>Co<sub>25</sub>Si<sub>10</sub>B<sub>15</sub>, 500 nm [ (4)]
  5. , 40 nm [ 2 (3')]
  6. MgF<sub>2</sub>, 440 nm [ 2 (2')]
  7. , 3.5 nm [ 2 (1')]
- : 605 nm
- Fe<sub>50</sub>Co<sub>25</sub>Si<sub>10</sub>B<sub>15</sub>
- 1
3. OVP
- OVP 1 (R) CoFe<sub>2</sub>O<sub>4</sub> (C)
- 7
1. , 3.5 nm [ 1 (1)]
  2. MgF<sub>2</sub>, 385 nm [ 1 (2)]
  3. , 40 nm [ 1 (3)]
  4. CoFe<sub>2</sub>O<sub>4</sub>, 100 nm [ (4)]
  5. , 40 nm [ 2 (3')]
  6. MgF<sub>2</sub>, 385 nm [ 2 (2')]
  7. , 3.5 nm [ 2 (1')]

: 530 nm

CoFe<sub>2</sub>O<sub>4</sub>

OVP

4. OVP

OVP 1 (R) , BaFe<sub>12</sub>O<sub>19</sub> (C)

7

1. , 3.5 nm [ 1 (1)]

2. MgF<sub>2</sub>, 385 nm [ 1 (2)]

3. , 40 nm [ 1 (3)]

4. BaFe<sub>12</sub>O<sub>19</sub>, 300 nm [ (4)]

5. , 40 nm [ 2 (3')]

6. MgF<sub>2</sub>, 385 nm [ 2 (2')]

7. , 3.5 nm [ 2 (1')]

: 530 nm

BaFe<sub>12</sub>O<sub>19</sub>

OVP

3,000

가

OVP

가

1 가

4

1 (4)

(4)

(4)

가



5. OVP

OVP (R) 2 (C) OVP 4

1. 3.5 nm [ 1 (1)]
2. MgF<sub>2</sub>, 440 nm [ 1 (2)]
3. 40 nm [ 1 (3)]
4. Fe<sub>2</sub>O<sub>3</sub>, 500 nm [ (4)]

: 605 nm

Fe<sub>2</sub>O<sub>3</sub>

6. EAS OVP

OVP 2 EAS Fe<sub>60</sub>Co<sub>15</sub>S  
 i<sub>10</sub>B<sub>15</sub> (C) - EAS (R)

1. 3.5 nm [ (1)]
2. MgF<sub>2</sub>, 385 nm [ (2)]
3. 40 nm [ (3)]
4. Fe<sub>60</sub>CO<sub>15</sub>Si<sub>10</sub>B<sub>15</sub>, 200 nm [ 1 (4)]
5. 200 nm [ 2 (4)]

: 530 nm

Fe<sub>60</sub>CO<sub>15</sub>Si<sub>10</sub>B<sub>15</sub>

UV

(interrogating) , Fe<sub>60</sub>CO<sub>15</sub>Si<sub>10</sub>B<sub>15</sub> 가 5

(57)

1.

1 (3,3'), 1 (2,2'), 1 (1,1') 1  
 (4) ,  
 (4) (3) (2) .

2.

1 , (4) 2 (3,3') .

3.

1 2 , (4) , , , 가 .

4.

1 3 (4) / MFe<sub>2</sub>O<sub>4</sub> [M  
 Mg, Mn, Co, Fe, Ni, Cu, Zn ]  
 / A<sub>3</sub>B<sub>5</sub>O<sub>12</sub> [A Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu Bi  
 , B Fe, Al, Ga, Ti, V, Cr, Mn Co  
 ] .

5.

1 4 , (3,3') , , , , .

6.

1 5 , (4) , .

7.

6 , 2 1 1 .

8.

1 (3,3'), 1 (2,2'), 1 (1,1') 1  
 (4) , ,

(a) (1,1') (2,2') ,

(b) (2,2') (3,3') ,

(c) (3,3') (4)

9.

8 ,

(d) (4) 2 (3') ,

(e) 2 (3') 2 (2') ,

(f) 2 (2') 2 (1')

10.

1 7

11.

10

12.

1 7

13.

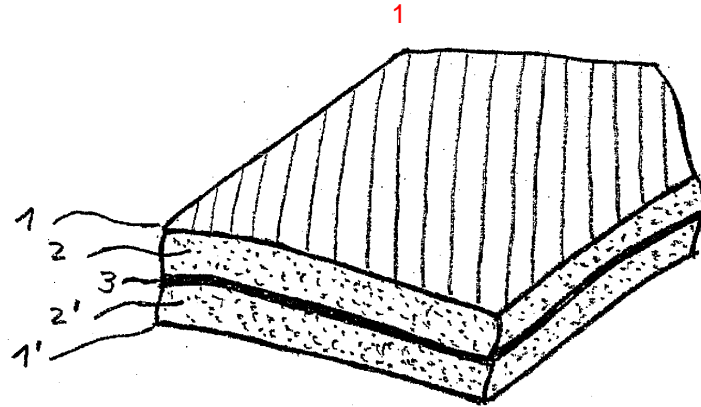
1 , 1 2 , 2 2 1 ,

14.

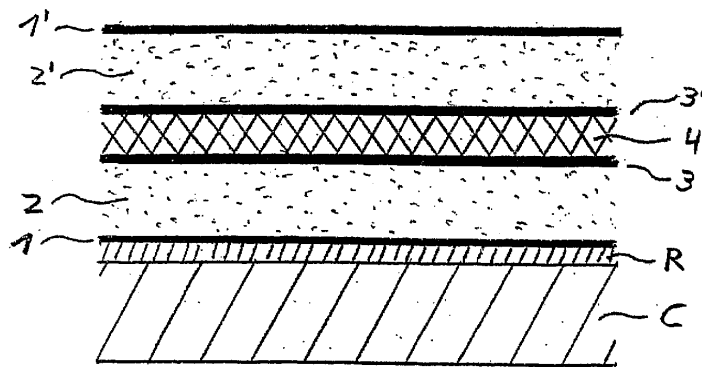
1 7 , 10 13

15.

14 , 가



2



3

