

**(19)**  
**(12)**

**(KR)**  
**(A)**

**(51) . Int. Cl.<sup>7</sup>**  
**C23C 22/34**

**(11)**  
**(43)**

**10-2004-0043135**  
**2004 05 22**

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|      |                   |      |                |
|------|-------------------|------|----------------|
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| (86) | PCT/EP2002/006888 | (87) | WO 2003/002781 |
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|      |            |            |      |
|------|------------|------------|------|
| (30) | 10131723.9 | 2001 06 30 | (DE) |
|------|------------|------------|------|

|      |   |    |   |
|------|---|----|---|
| (71) | 가 | 가  |   |
|      | 1 | 15 | 1 |

|      |         |    |  |
|------|---------|----|--|
| (72) | - 40217 | 33 |  |
|------|---------|----|--|

|         |   |    |  |
|---------|---|----|--|
| - 40225 | 가 | 83 |  |
|---------|---|----|--|

|         |   |  |  |
|---------|---|--|--|
| - 92700 | 5 |  |  |
|---------|---|--|--|

|         |    |  |  |
|---------|----|--|--|
| - 46149 | 10 |  |  |
|---------|----|--|--|

(74)

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**(54)**

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, a) 0.02 20g/l / Zr, Ti, Hf Si  
          , b) 10 49.9 mg/l -

,

(bare metal)

가

(rinsing)

(conversion treatment)'

가

|   |                               |   |                            |                    |   |
|---|-------------------------------|---|----------------------------|--------------------|---|
| US-A-5 129 967<br>(no-rinse treatment)  | a) 10<br>, c) 0.17<br>0.3 g/l | 16 g/l  | d) 0.6 g/l                 | , b) 12<br>(baths) | 19 g/l  |
| EP-B-8 942<br>TiF <sub>6</sub> H <sub>2</sub> SiF <sub>6</sub><br>H <sub>2</sub> TiF <sub>6</sub> H <sub>2</sub> SiF <sub>6</sub> | a) 0.5<br>a) 25               | 10 g/l<br>(<br>100 g/l)                             | pH 3.5                     | b) 0.2<br>b) 25    | 8 g/l<br>100 g/l  |
|   |                               | c) 17   | 120 g/l                    |                    | H <sub>2</sub> ZrF <sub>6</sub> , H <sub>2</sub> ZrF <sub>6</sub> , |
| DE-C-19 33 013  | 30 g/l                        | 0.1   | 15 g/l                     | 3.5                | , 0.5   |
| DE-C-24 33 704  | 0.1<br>1 3.5 g/l              | 5 g/l<br>pH 6                                       | 8                          | pH                 | ZrO <sub>2</sub> 0  |
| US-A- 992 116   | 2.5                           | 5 pH  |                            |                    | 3   |
| a) 1 500 mg/l   |                               | 1.1 X 10 <sup>-5</sup> 5.3 X 10 <sup>-3</sup> mol/l |                            |                    |   |
| b) Zr, Ti, Hf Si(3 X 10 <sup>-3</sup> mol/l,  |                               | , 1.6 380 mg/l                                      | )                          |                    | 1.1 X 10 <sup>-5</sup> 1.   |
| c) g/l.   | 가                             | ( )   |                            |                    | 0.26 20   |
|   |                               | 2.5:1 1:10  |                            |                    |   |
| DE-A-27 15 292  | 10 ppm /                      | , 10 , 1000 ppm<br>13 ppm                           | 1.5 4 pH /                 | 가                  |   |
| WO 92/07973<br>3-(N-C <sub>1-4</sub> - -N-2-  | 0.01<br>)-4-                  | 18 % H <sub>2</sub> ZrF <sub>6</sub><br>0.05 10 %   | 0.01<br>SiO <sub>2</sub> , | 10 %               |   |
| 0.06 0.6 %  |                               |   |                            |                    |   |

가

DE 100 05 113

가

2가

2가

DE 100 05 113

0.05 200 g/l

가

DE 100 05 113

/ Zr, Ti, Hf Si  
/ Zr, Ti, Hf Si

, a) 0.02 20 g/l

b)

10 49.9 mg/l

가

'(non-layer-forming)

, 0.3 2 g/l

Zr, Ti, Hf Si  
pH

pH

, pH

가

2가

(= (terpolymer))

3

2

113

가

DE 100 05

H

가

가

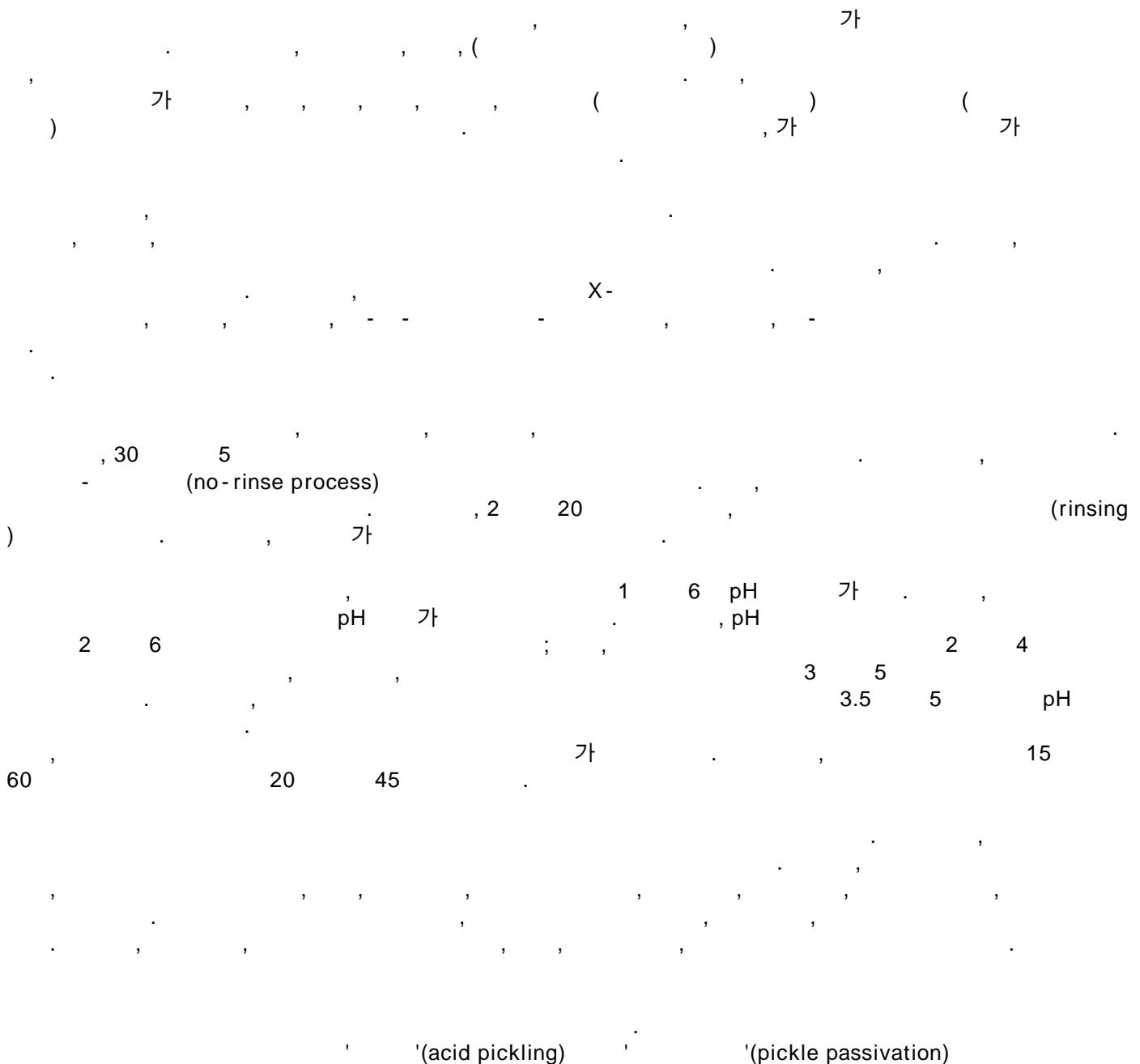
가

p

|      |           | 가         | pH         |
|------|-----------|-----------|------------|
| a) 5 | 20g/l, 20 | 8         | Zr, Ti, Hf |
| b)   | 1000mg/l, | 16 g/l 50 | / Si가      |
|      |           | 400mg/l   |            |
|      | -         | -         | 20 45mg/l  |

[ 1 ]

|   |   |                     |
|---|---|---------------------|
|   |   |                     |
| , |   | Luviskol , BASF/ISP |
| / |   | Luviskol , BASF/ISP |
| / |   | Luvitec , BASF      |
| / |   | ISP , Antaron       |
| / |   | ISP                 |
| / |   | ISP , Styleze       |
| / | , | ISP , Gafquat       |
| / | / | ISP                 |
| / | - | ISP , Gafquat       |
| / | / | ISP , Advantage     |
| / |   | ISP , Antara        |

1 :

- (Hot-dip galvanized steel)(HDG), (EG), (AC120), (CRS)  
 ( ):  
 1. : (Ridoline )1570, 3%; 82 , 55

(Ridosol 1270, 0.3% ( )

2. :

3. : , 0.23%, 82 ,

4. :

5. : 108 ; 30 , H<sub>2</sub>ZrF<sub>6</sub> (45%; 1.38g/l), / (37mg/l)  
) .

6. :

7. :

8. : (BASF CG 310)

: 20~23μm

\_\_\_\_\_ 2: 3 4

\_\_\_\_\_ :

:

: - 가 CASS

DIN 50021, 10

: SS DIN 50021, 21

: (scribe) (Creepage)(

):

U/2 mm; - (K , K=1: , K=10: )

[ 2]

|      | CRS    | HDG | EG | AC120  |
|------|--------|-----|----|--------|
|      | U/2 mm | K   | K  | U/2 mm |
| 3, 4 | 0.7    | 8   | 9  | 0.8    |
| 3, 4 | 1.6    | 10  | 10 | 0.9    |

\_\_\_\_\_ 3: ( )

: CRS, EG, HDG

( ):

1. : (Ridoline )1570, 2%; (Ridosol )1237, 0.3%; 5 ;

55 ( )

2. :

3. : 180 ; 30 ,

$H_2ZrF_6$  (45%, 1.38 g/l)

/

(=  $P_a$ ) +

/

(=  $P_b$ ) (37 mg/l )

4. :

5. :

6. : PES 5807/RAL 5009 GL(TIGC- ,

); . 60-80 $\mu m$

DIN 50021 SS, 21

: , ;  
- (cross-cut)

[ 3]

|     |       | ( 0 5) |
|-----|-------|--------|
| CRS | 1.7mm | 0      |
| EG  | 2.5mm | 0      |
| HDG | 1.8mm | 0      |

, , - /  $P_a > 0$   $P_a \% = 100\% - P_b \%$

4: ( )

: CRS

( )

1. : (Ridoline )1570, 2%; (Ridosol )1237, 0.3%; 5 ; 55

2. :

3. : 180 ; 30 ,

$H_2ZrF_6$  (45%, 1.38 g/l)

+ /

(=  $P_b$ ) +

/

(=  $P_a$ ) (22 mg/l )

4. :

5. :

6. : PES 5807/RAL 5009 GL(TIGC- ,

); . 60-80 $\mu m$

DIN 50021 SS, 21

[ 4]

|            |       |
|------------|-------|
|            |       |
| 100% $P_a$ | 3.9mm |
| 70% $P_a$  | 2.3mm |

가

(57)

1.

Zr, Ti, Hf Si

a) 0.02 20g/l / Zr, Ti, Hf Si  
b) 10 49.9 mg/l

가

2.

1 ,

3.

1      2

,

가

4.

1            3

5.

4

,

1            3

6.

1            3