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(54) Title: DIGITAL BROADCASTING TRANSMISSION/RECEPTION DEVICES CAPABLE OF IMPROVING A RECEIVING PERFORMANCE AND SIGNAL PROCESSING METHOD THEREOF

(57) Abstract: Disclosed is a digital broadcasting transmission/reception system having an improved reception performance and a signal-processing method thereof. A digital broadcasting transmitter comprises a TS stream generator for inputting robust and normal packets having stuff bytes in predetermined positions and generating dual TS stream by inserting the robust packets between the normal packets; a randomizer for randomizing the dual TS stream; a stuff byte exchanger for replacing the stuff bytes of a randomized data streams from the randomizer to a predetermined known data; and an encoder for encoding a data streams to which the known data is inserted. Accordingly, the present invention detects the known data from a signal received from a reception side and uses the detected known data for synchronization and equalization, so that the digital broadcasting reception performance can be improved at poor multipath channels.



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DESCRIPTION

Invention Title

COMPOSITION FOR REMOVING A (PHOTO)RESIST

Technical Field

5 The present invention relates to a removing composition for removing resists in a photo-lithography process. More particularly, the present invention relates to a removing composition which can minimize corrosion of the metallic circuitry during the resist removal process when it is used for the process of
10 patterning the metallic circuitry and has an excellent ability to remove resist.

Background Art

Photo-resist is an essential material used in the photo-lithography process, and the photo-lithography process is one of the general processes used to manufacture semiconductor devices such as integrated circuits (IC), large scale
15 integration (LSI), very large scale integration (VLSI) and image display devices such as liquid crystal displays (LCD) and plasma display devices (PDP).

However, when resist is eliminated by removal solution at high temperatures after photo-lithography processing, problems can arise where the removal solution quickly corrodes the underlying metal substrate at high
20 temperature.

That is, the degree of corrosion of the metallic circuitry can be accelerated by the resist removal solution. A removal solution to avoid this problem has been suggested in USP No. 5,417,877 and USP No. 5,556,482.

In the method previously proposed in those patents, a remover
25 composition consisting of a mixture of amide compound and organic amine with added anti-corrosive agents was used to prevent the corrosion of copper on the metal wire, where the preferred amine is specified to be monoethanolamine as the organic amine. The appropriate dose of anticorrosive agents is also introduced where the capacity to remove the photo-resist film decreases when exceeding this
30 dose.

Primary or secondary amines such as monoethanolamine and methylethanolamine have conventionally been used as the amine component of

the resist remover.

However, because of the low boiling point of such open chain amines, their composition is unstable, so that there is the inconvenience of having to regularly replace the whole removal solution during the treatment process due to a change
5 in weight and composition after a certain period of time caused by their volatility.

DISCLOSURE

Technical Problem

It is an objective of the present invention to provide a resist remover composition that has an excellent ability to remove resist film, and that does not
10 corrode the metallic circuitry when removing the resist film used in patterning process of metallic circuitry or displays.

Technical Solution

To attain this objective, the present invention provides a resist remover composition containing amine, solvent, and anticorrosive agent. The anticorrosive
15 agent is one or more compounds selected from the group consisting of triazole group compounds, mercapto group compounds, benzens having a hydroxyl group, and a mixture thereof.

Preferably, the amine is a cyclic amine compound and solvent is protonic polar solvent, aprotic polar solvent, or a mixture thereof.

20 Preferably, the resist remover composition contains 0.5 to 10 parts by weight of the anticorrosive agent based on 100 parts by weight of a mixture containing 5 to 30 wt% of the cyclic amine and 70 to 95 wt% of the protonic polar solvent.

Also, the resist remover composition of the present invention can contain
25 0.5 to 10 parts by weight of the anticorrosive agent based on 100 parts by weight of a mixture containing 5 to 30 wt% of the cyclic amine and 70 to 95 wt% of an aprotic polar solvent.

Preferably, the resist remover composition contains 0.5 to 10 parts by weight of the anticorrosive agent based on 100 parts by weight of a mixture
30 containing 5 to 30 wt% of the cyclic amine, 70 to 95 wt% of the protonic polar solvent, and 15 to 70 wt% of the aprotic polar solvent.

Advantageous Effects

The resist remover composition of the present invention minimizes the corrosion of the metal layer under the resist, and has the effect of completely removing and washing away resist, while providing stability to the process due to
5 little change in the composition by volatilization during heating.

BEST MODE

Hereinafter is given a detailed description of the present invention.

It was discovered that utilization of amine and solvent which doesn't have an effect on corrosion of metal wire prevents corrosion of the bottom film due to
10 Galvanic coupling with the upper metal film and eliminates resist effectively at the same time.

However, amine which doesn't typically corrode metal wire acutely corrodes single film when mixed with 01. to 3 wt% water, and corrodes the upper and lower layers in double film layers through Galvanic coupling. And even when
15 water is not mixed in the resist remover composition, corrosion by Galvanic coupling occurs if it is not washed after the exfoliation process with an alcohol such as isopropyl alcohol.

Therefore, the present invention is characteristic in that a small amount of an anticorrosive agent. The resist remover composition can minimize corrosion of
20 the metallic circuitry during the resist removal process when it is used for the process of patterning the metallic circuitry and has an excellent ability of resist removal.

The resist remover composition of the present invention comprises amine, solvent, and anticorrosive agent for prevention of corrosion by the small amount of
25 water contained therein.

The anticorrosive agent that are compounds that contain -N-, -S-, -O- and other such elements which have a pair of non-covalent electrons are effective at prevention of corrosion, and in particular, ability of -OH, -SH groups in prevention of corrosion by physical or chemical adsorption to metals is excellent.

30 The anticorrosive agent is one or more compounds selected from the group consisting of triazole group compounds, mercapto group compounds, benzenes having hydroxyl group, and a mixture thereof. As a preferable example,

the anticorrosive agent can be one or more compounds selected from the group consisting of mercaptobenzimidazol, mercaptomethylimidazol, hydroxypyridine, dihydroxypyridine, methyl trihydroxybenzoate, tolyl triazole, benzotriazole, and carboxylic benzotriazole.

5 Here, the present invention can maximise the efficacy of corrosion prevention by selectively using an anticorrosive agent for particular metal wire.

The triazole group has a good ability of preventing corrosion for all metal wire, mercapto group has good ability for Cu, Mo, benzene group having hydroxyl group has good ability for Cu and Al. The anticorrosive agent of the triazole group
10 is suitable for the formation of oxidation film, decreasing the oxygen at the surface of Cu or Al, and preventing transfer of proton by chemical adsorption to the oxidation film. In the case of mercapto group, the anticorrosive agent can prevent Galvanic coupling by lowering the oxidation-reduction potential, as well as chemically adsorb to the surface of Cu.

15 The resist remover composition can contain 0.5 to 10 parts by weight of the anticorrosive agent based on 100 parts by weight of a mixture of cyclic amine and solvent. If the content of the anticorrosive agent is below 0.1 parts by weight, the metal wire is corroded beyond control. Otherwise, if it exceeds 10 parts by weight, the ability of removal decreases and it is difficult to properly wash away due
20 to strong adsorption of the anticorrosive agent to the substrate plate.

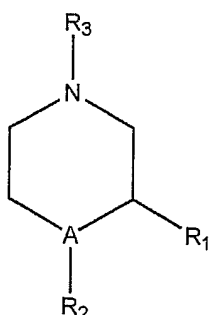
Preferably, the composition of the present invention is a two or three-component composition of protonic polar solvent or aprotic polar solvent individually or a mixture of one or more thereof. A preferable example is where resist removing composition of the present invention is a two-component
25 compound containing the cyclic amine and protonic polar solvent, or it can be a two-component compound containing the cyclic amine and aprotic polar solvent. It can also be a three-component compound containing the cyclic amine and both protonic polar and aprotic polar solvents.

Being strongly alkaline, this amine compound could cause to break the
30 attractive force in intra or inter-molecules by penetrating the cross-linked resist polymer matrix transformed under various processes such as dry etching or wet etching, and ashing or ion implant processing. This reaction caused by amine

compound helps to remove resist attached onto the substrate plate by transforming the remaining resist to an amorphous polymer gel mass by forming empty internal space in structurally weak areas of the resist. Preferably, the present invention uses cyclic amine which has high boiling point so that it does undergo significant changes in its weight or composition, and shows similar removal ability of previous open chain amines, and can be utilized for longer during the treatment process.

The cyclic amine compounds can be one or more compound selected from the group consisting of in [Chemical formula 1] below.

Chemical formula 1



(Wherein A is O or N,

R₁ is C₁ to C₅ alkyl, or C₁ to C₅ allyl,

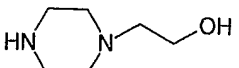
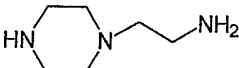
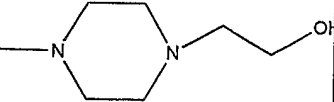
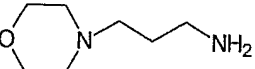
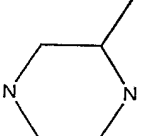
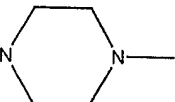
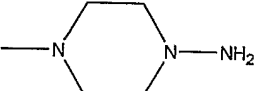
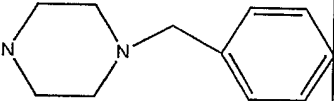
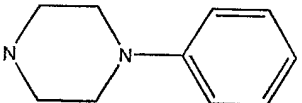
R₂ and R₃ are each independently or simultaneously C₁ to C₅ alkyl, C₁ to C₅ allyl, C₁ to C₅ alkyl amino, C₁ to C₅ hydroxyl alkyl (alkyl alcohol), or C₁ to C₅ alkyl benzene.)

Preferably, the cyclic amine is a piperazine group or a morpholine group compound.

More preferably, the cyclic amine compounds is one or more compounds selected from the group consisting of 1-(2-hydroxyethyl)piperazine (1-1), 1-(2-aminoethyl)piperazine (1-2), 1-(2-hydroxyethyl)-4-methylpiperazine (1-3), and N-(3-aminopropyl)morpholine (1-4), 2-methylpiperazine (1-5), 1-methylpiperazine (1-6), 1-amino-4-methylpiperazine (1-7), 1-benzylpiperazine (1-8), and 1-phenylpiperazine (1-9). The basicity of the compounds is as shown in table 1 below.

Table 1

	Nomenclature	Structure	pH(25% aqueous solution)	Boiling point
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(1-1)	1-(2-hydroxyethyl)piperazine		11.01	246 °C
(1-2)	1-(2-aminoethyl)piperazine		12.77	222 °C
(1-3)	1-(2-hydroxyethyl)-4-methylpiperazine		10.70	? °C
(1-4)	N-(3-aminopropyl)morpholine		11.31	224 °C
(1-5)	2-methylpiperazine		12.03	155 °C
(1-6)	1-methylpiperazine		11.75	120 °C
(1-7)	1-amino-4-methylpiperazine		11.88	177 °C
(1-8)	1-benzylpiperazine		11.50	260 °C
(1-9)	1-phenylpiperazine		11.32	285 °C

We can predict the removal-ability of these cyclic amine compounds by its basicity. The corrosive property is significantly improved compared with open chain amines, although it varies depending on the substitution of the remaining two hydrogens bonded to nitrogen of the amine compound.

5

1-(2-aminoethyl)piperazine, a cyclic amine, contains primary, secondary, and tertiary amine in one structure, and the groups affecting corrosion and exfoliation are the primary and secondary amines. Thus 1-(2-aminoethyl)piperazine is worse in terms of corrosion and exfoliation than other cyclic amines, but better than open chain amines.

During the removal process at high temperature, using a cyclic amine with a boiling point above 200 °C can minimize the change in removal ability due to composition change. This cyclic amine does not volatilize much so that it maintains its initial composition.

5 In the present invention, it is preferable for both two-component and three-component compositions to contain 5 to 30 wt% of the total composition, because if the content of amine is below 5 wt%, the resist-removal ability decreases. If the content of amine exceeds 30 wt%, the corrosion problem can become worse.

10 The protonic polar solvent is preferably one or more glycoether compounds selected from the group consisting of ethyleneglycol methylether, ethyleneglycol ethylether, ethyleneglycol butylether, diethyleneglycol methylether, diethyleneglycol ethylether, diethyleneglycol butylether, and diethyleneglycol propylether.

15 However, simple alkyleneglycol compound without ether bonds causes corrosion with tiny holes on the copper surface.

To prevent this problem, it is best to use the glycoether solvent with boiling point above 180 °C and almost unlimited solubility in water. Diethyleneglycol methylether, diethyleneglycol butylether, and diethyleneglycol ethylether would be most appropriate.

20 During the removal process at high temperature, using glycoether solvent with boiling point above 180 °C could minimize the change in removal ability due to change in composition. This glycoether solvent does not volatilize much so that it maintains its initial composition.

Thus, it maintains the ability to remove resist throughout the whole process.

25 Also, the glycoether solvent with boiling point above 180 °C can improve removal efficacy of resist because of its low surface force on metal film layer and resist, and due to its low freezing point and high combustion point, it is more stable during storage.

30 In the case of two-component compositions, it is preferable to use the protonic polar solvent with 70 to 95 wt% of total composition. If the content is below 70 wt%, corrosion occurs excessively because of the increase of amine content,

and removal performance declines if the content exceeds 95 wt%.

For three-component compositions, it is preferable to use the protonic polar solvent at 10 to 80 wt%. Below 10 wt %, the weight percentage of aprotic polar solvent and amine compound is relatively increased, which causes excessive corrosion of metal wire and decreases the resist removal ability because of the deficiency in ability to dissolve the polymer gel created by the amine compound and aprotic polar solvent.

Moreover, the present invention establishes the role of aprotic polar solvent to dissolve exfoliated high polymer gel mass into unit molecules. Especially, it can prevent re-adhesion of removed resist that commonly occurs during the washing process. Polar solvent with amine as the functional group like N-methyl-2-pyrrolidone assists the amine compound penetrate and remove resist.

The aprotic polar solvent is one or more compounds selected from the group consisting of N-methyl-2-pyrrolidone, N,N-dimethylacetamide, N,N-dimethylformamide, and N,N-dimethylimidazole.

For the case of two-component composition, it is appropriate to have a content of protonic polar solvent that is 70 to 95 wt% of the total composition. If the content is below 70 wt%, corrosion occurs excessively because of the increase of amine constituent, and removal performance diminishes under the condition of its content over 95 wt%.

Otherwise, for three component composition, the content of protonic polar solvent would preferably be 15 to 70 wt% of the total composition. Its content less than 15 wt% would decrease the resist removal ability. If it exceeds 70 wt%, metal wire is excessively corroded, and its potential to remove and wash resist decreases because of the relative decrease in weight % of glycolether, a protonic polar solvent.

As described above, the present invention defines composition comprising cyclic amine for resist removal during use in photo-lithography, which shows excellent ability to remove resist and minimize the problem of patterned metal wire corrosion.

Mode for Invention

The present invention is described in more detail through examples and

comparisons that follow. As those skilled in the art would realize, the described embodiments may be modified in various different ways, all without departing from the spirit or scope of the present invention.

5 In the Examples below, percentage or mixture ratio is weight based, unless otherwise noted.

<Examples>

The purpose of Experiment 1 and 2 is to select proper amine and glycolether solvent, a protonic polar solvent. The test sample is described below.

10 First, to evaluate the corrosion of metal by the solvents, after coating with 2000 Å aluminum, molybdenum, and copper, the developed glass after coating with resist was used as a specimen.

15 Second, to estimate ability of resist removal, the specimen, n+a-Si:H active film, was prepared with glass coated with Chrome which after spreading resists underwent wet etching then treated with dry etching gas. Chrome maximizes adhesive strength of resist, and dry etching gas transforms resist into a form that is difficult to remove with removal solution. Thus, the specimen is suitable for testing the ability of resist removal.

<Experiment 1>

20 The result of testing resist removal and corrosion of aluminum, molybdenum, and copper for each solvent is described below in Table 2

Table 2

	aluminum	molybdenum	copper	Resist removal
	70 °C 20min. soaking			70 °C 1min. soaking
Monoethanol amine	×	×	×	◎
1-(2-hydroxyethyl)piperazine	○	○	○	◎
1-(2-aminoethyl)piperazine	○	○	×	◎
1-(2-hydroxyethyl)-4-methylpiperazine	◎	◎	◎	△
N-(3-aminopropyl)morpholine	△	△	×	◎
2-methylpiperazine	○	○	△	◎
1-methylpiperazine	○	○	○	◎
1-amino-4-methylpiperazine	○	○	○	◎
1-benzylpiperazine	○	○	○	◎
1-phenylpiperazine	○	○	○	◎
N-methyl-2-pyrrolidone	◎	◎	◎	○
N,N-dimethylacetamide	◎	◎	◎	○
Diethyleneglycolbutylether	◎	○	◎	△
Diethyleneglycolethylether	◎	○	◎	△

In Table 2 above,

* resist removal

5

◎ (complete removal of resist) ○ (low level of residual resist),

△ (a high level of residual resist), × (no removal of resist)

*corrosion

◎ (no corrosion), ○ (slight corrosion), △ (severe corrosion),

× (complete corrosion)

As presented above in Table 2, monoethanol amine shows severe corrosion of metal while cyclic amines cause less corrosion of metal and removes resist just as well. Substitution of all hydrogens bonded to nitrogen of cyclic amine structures with alkyl, benzyl, or alcohol groups shows superior prevention of corrosion but lower removal ability.

<Experiment 2>

As shown in Table 3, typically-used monoethanol amine and amines used in this present invention were tested for corrosion rate of metal. As individual tests showed a small amount of corrosion of every metal, the same solution comprising 45 wt% of glycoether, 45 wt% of polar solvent and 10 wt% amine was used for all cases.

Table 3

Types of amine	Rate of metal corrosion		
	Aluminium	Molybdenum	Copper
Monoethanol amine	○	○	×
1-(2-hydroxyethyl)piperazine	◎	◎	◎
1-(2-aminoethyl)piperazine	◎	◎	×
N-(3-aminopropyl)morpholine	○	○	×
1-(2-hydroxyethyl)4-methylpiperazine	◎	◎	◎
2- methylpiperazine	◎	○	○
1- methylpiperazine	◎	◎	◎
1-amino-4-methylpiperazine	◎	○	◎
1- benzylpiperazine	◎	◎	◎
1- Phenylpiperazine	◎	◎	◎

In Table 3 above,

◎ (no corrosion), ○ (slight corrosion),

△ (severe corrosion), × (complete corrosion)

As shown in Table 3, compared to previously used monoethanal amine, cyclic amines were better in terms of corrosion for aluminum and molybdenum. For copper, the more substitution of the hydrogens bonded to nitrogen in cyclic amine structure for other functional group, the better it was in terms of corrosion.

5 Experiment 3 and 4 were carried out to estimate which component of resist remover affects removal ability and corrosion of metal wire. The specimens for these experiments are prepared as follows.

Specimen for Experiment 3

(1) Apply DTFR-3650B(Dongjin Semichem, positive resist) on glass, and
10 then remove resist after baking at 170 °C, 25min. Size of specimen is 2cm × 4cm

Specimen for Experiment 4

(2) Apply aluminum, molybdenum, and copper on the glass plate with
2000 Å thickness. Size of specimen is 2cm × 4cm

With the prepared specimen above, the experiment was performed with
15 different compositions of removal solution.

Table 4

Components comprising removal solution								
Classification	Amine		Glycolether		Polar solvent		Anticorrosive agent	
	Class	Content (wt%)	Class	content (wt%)	Class	Content (wt%)	Class	Content (parts by weight)
Example 1	HEP	10	DEGBE	60	NMP	30	CBT	0.5
Example 2	AEP	10	DEGBE	60	NMP	30	CBT	0.5
Example 3	BP	10	DEGBE	60	NMP	30	CBT	0.5
Example 4	PP	10	DEGBE	60	NMP	30	CBT	0.5
Example 5	HEP	10	DEGBE	60	NMP	30	MTHB	0.5
Example 6	AEP	10	DEGBE	60	NMP	30	MTHB	0.5
Example 7	BP	10	DEGBE	60	NMP	30	MTHB	0.5
Example 8	PP	10	DEGBE	60	NMP	30	MTHB	0.5
Example 9	HEP	10	DEGBE	60	NMP	30	MMB	0.5
Example 10	AEP	10	DEGBE	60	NMP	30	MMB	0.5
Example 11	BP	10	DEGBE	60	NMP	30	MMB	0.5

Example 12	PP	10	DEGBE	60	NMP	30	MMB	0.5
Example 13	HEP	30			NMP	70	CBT	0.5
Example 14	AEP	30			NMP	70	CBT	0.5
Example 15	HEP	20	DEGBE	80			CBT	0.5
Example 16	AEP	20	DEGBE	80			CBT	0.5
Example 17	HEP	10	DEGEE	60	NMP	30	CBT	0.5
Example 18	AEP	10	DEGEE	60	NMP	30	CBT	0.5
Example 19	HEP	10	DEGBE	60	DMSO	30	CBT	0.5
Example 20	AEP	10	DEGBE	60	DMAc	30	CBT	0.5
Example 21	HEP	10	DEGBE	60	NMP	30	HP	0.5
Example 22	HEP	10	DEGBE	60	NMP	30	DHP	0.5
Example 23	HEP	10	DEGBE	60	NMP	30	TT	0.5
Example 24	HEP	10	DEGBE	60	NMP	30	BT	0.5
Example 25	HEP	10	DEGBE	60	NMP	30	MMI	0.5
Comparative example 1	HEP	10	DEGBE	60	NMP	30		
Comparative example 2	AEP	10	DEGBE	60	NMP	30		
Comparative example 3	BP	10	DEGBE	60	NMP	30		
Comparative example 4	PP	10	DEGBE	60	NMP	30		
Comparative example 5	MEA	10	DEGBE	60	NMP	30		
Comparative example 6	MEA	10	DEGBE	60	NMP	30	CBT	0.5

Note) In Table 4 above,

HEP : 1-(2-hydroxyethyl)piperazine,

2-MP : 2-methylpiperazine,

BP : benzylpiperazine,

5 MMB : mercaptomethylbenzimidazole,

TT : Tolly triazole,

CBT : Carboxylicbenzotriazole,

DMAc : dimethylacetamide,

DEGEE : diethyleneglycolethylether,

10 DEGBE : diethyleneglycolbutylether,

MTHB : methyltrihydroxybenzoate,

AEP: 1-(2-aminoethyl)piperazine

1-MP : 1-methylpiperazine

PP : phenylpiperazine

MMI : mercaptoethylimidazole

BT : benzotriazole

NMP : n-methyl-2-pyrrolidone

DMSO : dimethylsulfoxide

HP : hydroxypyridine, DHP : dihydroxypyridine

<Experiment 3>

Examples 1, 25 and comparative examples 1, 6 were tests for resist layer removal of specimen 1. Particularly, to test any change in resist removal ability
5 following volatilization, each removal solution was maintained under a condition of forced ventilation at 70 °C for 48 hrs. Table 5 shows the result of specimen (3). The removal solution was boiled at 70 °C. Specimen (1) is soaked and observed visually.

Table 5

Evaluation of removal			
Classification		(1) Soaking for 200 sec	(1) Soaking for 200 sec after volatilization for 48hr
Example	1	◎	◎
	2	◎	◎
	3	◎	◎
	4	◎	◎
	5	◎	◎
	6	◎	◎
	7	◎	◎
	8	◎	◎
	9	◎	◎
	10	◎	◎
	11	◎	◎
	12	◎	◎
	13	◎	◎
	14	◎	◎
	15	◎	◎
	16	◎	◎
	17	◎	◎
	18	◎	◎
	19	◎	◎
	20	◎	◎

	21	◎	◎
	22	◎	◎
	23	◎	◎
	24	◎	◎
	25	◎	◎
Comparative Example	1	◎	◎
	2	◎	◎
	3	◎	◎
	4	◎	◎
	5	◎	×
	6	◎	×

Note) In Table 5, * ◎ (complete removal of resist) ○ (a low level of residual resist), △ (a high level of residual resist), × (no removal of resist)

In comparative examples, when cyclic amines with low boiling point were kept for 24 hr at 70 °C, a significant fall in the ability of removal was observed.

- 5 Each anticorrosive does not greatly affect exfoliating performance, and since for all the examples, the boiling point of amine is over 200 °C, the exfoliating performance is not changed after volatilizing for 48 hr because the composition is not significantly changed.

<Experiment 4>

- 10 Using Specimen 2, examples 1 to 25 and comparative examples 1 to 6 was tested where 3 parts by weight of pure water was added to a 100 parts by weight of exfoliating solution and maintained at 70 °C. Corrosion of metal layer was measured and shown in Table 6 below.

Table 6

Evaluation of corrosion				
Classification		(4) Soaking for 600sec aluminum	(4) Soaking for 600sec molybdenum	(4) Soaking for 600sec copper
Example	1	◎	◎	◎
	2	◎	◎	○
	3	◎	◎	◎
	4	◎	◎	◎
	5	◎	○	◎
	6	◎	○	○
	7	◎	○	◎
	8	◎	○	◎
	9	○	◎	◎
	10	○	◎	○
	11	○	◎	◎
	12	○	◎	◎
	13	◎	◎	◎
	14	◎	◎	○
	15	◎	◎	◎
	16	◎	◎	○
	17	◎	◎	◎
	18	◎	◎	○
	19	◎	◎	◎

	20	◎	◎	○
	21	◎	○	◎
	22	◎	○	◎
	23	◎	◎	◎
	24	◎	◎	◎
	25	◎	◎	◎
Comparative Example	1	○	△	○
	2	○	△	×
	3	○	△	○
	4	○	△	○
	5	△	△	×
	6	○	○	△

In Table 6 above,

* ◎ (no corrosion), ○ (slight corrosion), △ (severe corrosion), ×

(complete corrosion)

According to the result in Table 6, in the Examples where 1-(2-aminoethyl) piperazine was used, slight corrosion of copper was observed. Although the results are slightly different depending on the type of amine, the results are generally superior in comparison to those of the Comparative Examples. Triazole is effective in preventing corrosion in all metal films according to the test result of Examples containing 1-(2-hydroxyethyl)piperazine.

The chemical structures containing a hydroxyl group such as methyltrihydroxylbenzoate, hydroxylpyridine, dihydroxypyridine give rise to poor results when using the molybdenum method. Anticorrosive agents with a mercapto group give rise to poor results when using the aluminum method.

It can be concluded from this result that anticorrosive agents with particular functional groups are exceedingly effective in preventing corrosion of particular metal wires. In particular, even when open chain amines rather than cyclic amines

are used, adding an anticorrosive agent improves anti-corrosiveness..

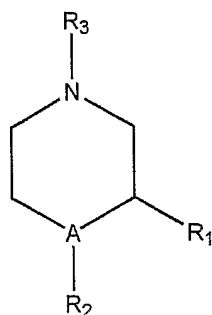
To summarize those test results, triazole such as benzotriazole, tolyl triazole, carboxylic benzotriazole shows good prevention of corrosion of any metal wires. Mercapto compounds such as mercaptomethylbenzimidazole and
5 mercaptomethylimidazole show better corrosion prevention on copper and molybdenum, and benzene ring structures with hydroxyl group such as hydroxypyridine, dihydroxypyridine, methyltrihydroxybenzoate show superior corrosion prevention on copper and aluminum. Therefore, one can maximize the efficacy of the process by using particular anticorrosive agent for particular specific
10 metal wires.

While this invention has been described in connection with what is presently considered to be practical exemplary embodiments, it is to be understood that the invention is not limited to the disclosed embodiments, but, on the contrary, is intended to cover various modifications and equivalent arrangements included
15 within the spirit and scope of the appended claims.

WHAT IS CLAIMED IS:

1. A resist remover composition comprising amine, solvent, and anticorrosive agent, wherein the anticorrosive agent is one or more compounds selected from the group consisting of triazole group compounds, mercapto group compounds, benzenes having a hydroxyl group, and a mixture thereof.
2. The resist remover composition according to Claim 1, wherein the resist remover composition comprises 0.5 to 10 parts by weight of the anticorrosive agent based on 100 parts by weight of a mixture of amine and solvent.
3. The resist remover composition according to Claim 1, wherein the amine is one or more compounds selected from the group consisting of cyclic amine compounds having the following Chemical Formula 1:

Chemical Formula 1



15

Wherein A is O or N,

R₁ is C₁ to C₅ alkyl, or C₁ to C₅ allyl,

R₂ and R₃ are each independently or simultaneously C₁ to C₅ alkyl, C₁ to C₅ allyl, C₁ to C₅ alkyl amino, C₁ to C₅ hydroxyl alkyl (alkyl alcohol), or C₁ to C₅ alkyl benzene.

20

4. The resist remover composition according to Claim 1, wherein the amine is one or more cyclic amine compounds selected from the group consisting of 1-(2-hydroxyethyl)piperazine, 4-(3-aminopropyl)morpholine, 1-piperazinethanamine(1-(2-aminoethyl)piperazine), and 1-(2-hydroxyethyl)-4-ethylpiperazine.
5. The resist remover composition according to Claim 1, wherein the amine is 5 to 30 wt% of 100 parts by weight of a mixture of amine and solvent.

25

6. The resist remover composition according to Claim 1, wherein the solvent is protonic polar solvent, aprotonic polar solvent, or a mixture thereof.
7. The resist remover composition according to Claim 6, wherein the protonic polar solvent is one or more compounds selected from the group consisting of
5 ethyleneglycol methylether, ethyleneglycol ethylether, ethyleneglycol butylether, diethyleneglycol methylether, diethyleneglycol ethylether, diethyleneglycol butylether, and diethyleneglycol propylether.
8. The resist remover composition according to Claim 6, wherein the aprotonic polar solvent is N-methyl-2-pyrrolidone, N,N-dimethylacetamide, N,N-
10 dimethylformamide, or N,N-dimethylimidazole.
9. The resist remover composition according to Claim 1, wherein the composition comprises the anticorrosive agent in an amount of 0.5 to 10 parts by weight based on 100 parts by weight of a mixture containing 5 to 30 wt% of cyclic amine and 70 to 95 wt% of protonic polar solvent.
- 15 10. The resist remover composition according to Claim 1, wherein the composition comprises the anticorrosive agent in an amount of 0.5 to 10 parts by weight based on 100 parts by weight of a mixture containing 5 to 30 wt% of cyclic amine and 70 to 95 wt% of aprotonic polar solvent.
- 20 11. The resist remover composition according to Claim 1, wherein the composition comprises the anticorrosive agent in an amount of 0.5 to 10 parts by weight based on 100 parts by weight of a mixture containing 5 to 30 wt% of cyclic amine, 10 to 80 wt% of protonic polar solvent and 15 to 70 wt% of aprotonic polar solvent.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2005/001327

A. CLASSIFICATION OF SUBJECT MATTER**IPC7 G03F 7/32**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7 G03F 7/32, G03F 7/42, C11D 7/26, C23F 1/10 etc.,

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KR, JP : clsaas as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

NPS, ESPACENET, DELPHION, IPDL.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,798,323 A (Olin Microelectronic Chemicals, Inc.) 1998. Aug. 25 see the whole document	1, 2, 5 - 8
Y		3, 4
Y	KR 2002-42490 A (Tosoh Corp.) 2002. Jun. 05 see the whole document	3, 4, 9 - 11
Y	KR 2003-30399 A (LG-Philips LCD CO.LTD) 2003. Apr. 18	9 - 11



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

05 AUGUST 2005 (05.08.2005)

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2005/001327

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