

Description

5 The present invention relates to a radiation-sensitive positive-working mixture which is composed essentially of at least one water-insoluble novolak resin or polyvinylphenol resin, which is soluble in aqueous alkaline solutions, as a binder, at least one o-quinone diazide as photosensitive compound and a solvent containing a propylene glycol alkyl ether acetate. The invention also relates to a photoresist material prepared therefrom.

10 The preparation of positive-working photoresist mixtures is known and is described, for example, in US-A 3,666,473, US-A 4,115,128 and US-A 4,173,470. These are alkali-soluble phenol formaldehyde/novolak resins in conjunction with photosensitive substances, normally substituted naphthoquinone diazide compounds. The resins and photosensitive substances are dissolved in an organic solvent or solvent mixture and deposited as a thin film or coating on a suitable film base for the intended application purpose.

15 The novolak resin component of these photoresist mixtures is soluble in aqueous alkaline solution, but at the same time the photosensitive naphthoquinone compound acts on the resin as an inhibitor. If, however, certain regions of the coated base are exposed to actinic radiation, the photosensitive compound undergoes a structural change induced by the radiation and the exposed regions of the coating become more soluble than the unexposed ones. As a result of this solubility difference, the exposed regions of the photoresist film dissolve when the film base is immersed in an alkaline developer solution, while the unexposed regions remain substantially unaffected so that a positive raised image is produced on the base.

20 In most cases, the developed film base is treated with an etching solution or gas plasma. During this process, the photoresist film protects the coated regions of the base against the etchant so that the latter is

only able to etch the regions laid bare. In the case of a positive-working resist those are the regions exposed to actinic radiation. An etching pattern which corresponds to the image of the mask, template etc., which was used to produce certain exposure patterns on the coated base before development can therefore be produced on the film base.

The raised photoresist image produced by the method described above on the film base is suitable for various application purposes, for example as a mask or image, for instance, in the production of semiconductor components in microelectronics.

The following are important properties for the production-engineering exploitation of a photoresist: photosensitivity, development contrast, image resolution and adhesion of the resist to the film base.

An increased photosensitivity is important for a photoresist, in particular if it is used for applications in which several exposures are necessary, for example in the production of multiple images by a repetition method or in cases in which light with attenuated intensity is used, for example in the projection exposure technique in which the light passes through a series of objectives and monochromatic filters. An increased photosensitivity is therefore very particularly important for a resist mixture which is used in methods in which multiple exposures have to be carried out in order to produce a mask or a series of circuits on a base. Optimum conditions result from a constant development temperature and time in a certain type of development and also from a developer system which is chosen so that a complete and full development of the exposed resist regions is achieved and, at the same time, the thickness loss of the unexposed resist regions is kept at not more than about 10% of the initial thickness.

Development contrast is understood to mean the difference between the percentage of film loss in the exposed regions after development and the percentage of film loss in the unexposed regions. Normally, a

resist-coated base is developed after exposure until the film in the exposed regions has essentially been completely stripped. The development contrast can therefore be determined by simply measuring the percentage of the film loss in the unexposed regions after the complete stripping of the exposed film regions.

Image resolution of the resist is understood to mean the ability of a resist system to reproduce the smallest line pairs arranged at equal distance from one another and the associated gaps of a mask used for the exposure with a high degree of edge steepness of the image in the fully developed exposed gaps.

For many technical applications, in particular for the production of semiconductor components in microelectronics, a photoresist must have a high degree of resolution if it is to reproduce small line and gap widths (in the order of magnitude of $1\text{ }\mu\text{m}$).

The ability of a resist to reproduce very small dimensions in the order of magnitude of $1\text{ }\mu\text{m}$ and below is of the greatest significance in producing VLSI circuits on silicon chips and similar components. The circuit density on such a chip can only be increased by increasing the resolving power of the resist - assuming photolithographic methods are employed. Although negative-working photoresists, in which the exposed regions of the resist film are insoluble in the developer and the unexposed regions are stripped by the developer, are used in the semiconductor industry on a large scale for this purpose, the positive-working resists nevertheless have by their nature a higher image resolution and are used as a replacement for the negative-working resists.

In the use of conventional positive-working photoresists for producing semiconductor components in microelectronics, there is the difficulty that the positive-working resists have, in general, a lower photosensitivity than the negative-working resists.

In the past various attempts have already been made to improve the photosensitivity of positive-working

photoresist mixtures. In US-A 3,666,473, a mixture is used, for example, of two phenol formaldehyde/novolaks together with a standard photosensitive compound, said novolak resins being defined by their solution rate in alkaline solutions of a certain pH value and by their cloud point.

In US-A 4,115,128, a third component, namely a cyclic anhydride of an organic acid, is added to increase the photosensitivity of the phenolic resin and the naphthoquinone diazide used as photosensitive compound.

It is also known to use photoresist mixtures which contain a propylene glycol alkyl ether acetate (US-A 4,550,069). It is furthermore known (DE-A 3,421,160) to use mono(C₁-C₄)alkyl glycol ethers of 1,2-propanediol in corresponding mixtures. These components act as solvents for the binder and the photosensitive compound and they thereby facilitate the deposition of the resist on the film base. The known compounds have a low toxicity compared with those which are normally used. It has, however, emerged that the known compounds used as solvents entail specific odour nuisance.

The document EP-A 0,195,315 belongs to the prior art according to Article 54(3) of the EPU. It describes a mixture without specific information about the ratio of the solvents.

The object of the present invention was to provide a radiation-sensitive positive-working mixture which has a lower odour nuisance for the attendant staff than conventional mixtures and at the same time, has unaltered or even improved properties in relation to the photosensitivity, erosion rate of the resist, plasma etching rate and development contrast.

The achievement of this object is based on a radiation-sensitive positive-working mixture of the type mentioned in the preamble and is characterised in that the solvent contains a mixture of a propylene glycol (C₁-C₄)alkyl ether acetate and a propylene glycol (C₁-C₄)alkyl ether in a mixing ratio of between 10:1 and

1:10 or is composed thereof. In a preferred embodiment, a solvent is present which contains a mixture of propylene glycol methyl ether acetate and propylene glycol methyl ether or is composed thereof. The mixture is, in particular, present in an amount of about 5 to 100 percent by weight, based on the solvent.

Surprisingly it was found that such an improved resist can be produced by mixing the novolak or polyvinylphenol resin as binder and the o-quinone diazide as photosensitive compound with a solvent mixture of a propylene glycol ether acetate and a propylene glycol alkyl ether component.

Photosensitive mixtures which contain only one of the two components according to the invention, a propylene glycol alkyl ether acetate or a propylene glycol alkyl ether, have the following disadvantages: the use of propylene glycol methyl ether acetate (PGMEA) entails an extremely unpleasant odour nuisance for about half the group of people coming into contact with this substance, it being predominantly women who complain of discomfort. The use of propylene glycol methyl ether (PGME) also signifies for about half the group of people handling this substance a severe odour nuisance, it being in this case predominantly men who complain. At the same time, it is the case that those who find the odour of PGMEA extremely troublesome find the smell of PGME pleasant, or at least not annoying, and vice versa. If mixtures of these solvents, that is to say of PGMEA and PGME are used in a mixing ratio of 1:1, none of the group of people concerned complains of appreciable discomfort. Photoresists, for the production of which mixtures of PGMEA and PGME have been used, can therefore be described as a class of photoresists with reduced odour nuisance.

Mixture and material are produced in a manner such that a mixture of at least one resin from the group comprising the novolaks and polyvinylphenols and at least one photosensitive o-quinone diazide compound is first formed in a solvent mixture containing a propylene glycol alkyl ether and a propylene glycol alkyl ether acetate,

and the mixture is applied to a suitable film base and dried so that an essentially nonsticky film is obtained which has a residual solvent proportion of 1 to 30%, based on the dry film weight.

5 The film obtained is exposed to an image by means of suitable actinic radiation and developed, as a result of which the exposed areas are removed with an aqueous alkaline developer.

10 The photoresist mixtures according to the invention not only have an excellent photosensitivity compared with known positive-working photoresists, but are also remarkable for a high degree of image resolution, a good development contrast and good adhesion properties. Having these properties, they differ markedly
15 from some known resists which do indeed have a moderately increased photosensitivity but this improvement is, however, achieved at the expense of resolving power and contrast. In addition, the mixture according to the invention smells better than known photoresist mixtures
20 and is less toxic, i.e. more environmentally friendly, in its application.

 The production of novolak resins which can be used for producing photosensitive mixtures is known. A method for producing said novolaks is described in
25 "Chemistry and Application of Phenolic Resins" by A. Knop and W. Scheib, Springer Verlag, New York, 1979, Chapter 4. Polyvinylphenols are described, for instance, in US-A 3,869,292 and US-A 4,439,516. The use of o-quinone diazides as is described in "Light Sensitive Systems" by
30 J. Kosar, John Wiley & Sons, New York, 1965, Chapter 7.4, is also known to the person skilled in the art. These photosensitive compounds, which form a constituent within the present invention, belong to the group of the substituted photosensitive naphthoquinone diazides as they
35 are normally used in positive-working photoresist mixtures. Such compounds which impart photosensitivity are known, for example, from US-A 2,797,213, US-A 3,106,465, US-A 3,148,983, US-A 3,130,047, US-A 3,201,329, US-A 3,785,825 and US-A 3,802,885.

Suitable photosensitive compounds are, for example, 1,2-naphthoquinone diazide-(2)-5-sulphonyl [sic] chloride and 1,2-naphthoquinone diazide-(2)-4-sulphonyl [sic] chloride condensed with phenolic compounds such as hydroxybenzophenones.

In a preferred embodiment, the content of solid constituents of the photoresist mixture, i.e. of binder and diazide, is preferably about 15 to 99 percent by weight of binder and about 1 to 85 percent by weight of o-quinone diazide. In particular, the mixture contains the binder in a proportion of about 50 to 90 percent by weight, and very particularly preferably, about 65 to 85 percent by weight, based on the weight of the solid constituents of the photoresist. The proportion of diazide is, in particular, about 10 to 50 percent by weight, and very particularly preferably, about 15 to 35 percent by weight, based on the weight of the solid constituents of the photoresist mixture. To produce the photoresist mixture, the binder and the diazide are mixed with a solvent mixture of a propylene glycol alkyl ether and a propylene glycol alkyl ether acetate in a manner such that the solvent mixture is present in a proportion of about 40 to 90 percent by weight, preferably of about 60 to 83 percent by weight, and in particular, of about 65 to 70 percent by weight, in all cases based on the weight of the entire resist mixture. At the same time the weight ratio of PGMEA and PGME may vary in wide limits as a function of the particular application-engineering requirements. For instance, the ratio may be between 1:20 and 20:1. Preferably, the mixing ratio of PGMEA and PGME is between 10:1 and 1:10, in particular between 6:4 and 4:6. Very particularly preferred is a mixing ratio of about 1:1 parts by weight.

Further additives such as, for example, colorants, dyestuffs, levelling agents, plasticisers, adhesion promoters, development accelerators, further solvents and surfactants, for example nonionic surfactants, may be added to the solution of binder, photosensitive compound and solvent mixture before

deposition on a film base.

Dyestuffs which may be used as additives for the photoresist mixtures according to the invention are, for example, methylviolet 2B (C.I. 42 535), crystal violet (C.I. 42 555), malachite green (C.I. 42 000), victoria blue B (C.I. 44 045) and neutral red (C.I. 50 040). These dyestuffs are added in an amount of 1 to 10 percent by weight, based on a total weight of binder and photosensitive compound. The dyestuff additives reduce the back scattering of light from the film base and thus contribute to an improved image resolution.

Levelling agents can be used in an amount of up to 5 percent by weight, based on the total weight of binder and photosensitive compound.

Suitable plasticisers are, for example, tri(β -chloroethyl)phosphate, stearic acid, dicamphor, polypropylene, acetal resins, phenoxy resins and alkyd resins, which can be added in proportions of 1 to 10 percent by weight, based on the total weight of binder and photosensitive compound. The plasticiser additives improve the coating properties of the mixture and make possible the application in a smooth and uniformly thick film to the film base.

Suitable adhesion promoters are, for example, β -(3,4-epoxycyclohexyl)ethyltrimethoxysilane, p-methyldi-silanemethyl methacrylate, vinyltrichlorosilane and γ -aminopropyltriethoxysilane in a proportion of up to 4 percent by weight, based on the total weight of binder and photosensitive compound.

As development accelerators, for example, picric acid, nicotinic acid or nitrocinnamic acid can be added in a proportion of up to 20 percent by weight, based on the total weight of binder and photosensitive compound. Said accelerators have the result that the solubility of the photoresist film increases both in the exposed and in the unexposed regions and they are therefore used in those applications in which it is primarily the development rate which is important, even if a certain degree of contrast is possibly sacrificed at the same time since

while the exposed regions of the photoresist film are dissolved more rapidly by adding developer accelerators, the development accelerators also bring about a greater loss of photoresist film from the unexposed regions.

5 Suitable additional solvents are, for example, xylene, butyl acetate and ethylene glycol methyl ether acetate, which may be present in a proportion of up to 95 percent by weight in the total solvent; preferably, however, no additional solvents are used in the mixture.

10 As nonionic surfactants, use may be made, for example, of nonylphenoxypoly(ethyleneoxy)ethanol, octylphenoxy(ethyleneoxy)ethanol and dinonylphenoxypoly(ethyleneoxy)ethanol in a proportion of up to 10 percent by weight, based on the total weight of binder and
15 photosensitive compound.

 The finished photoresist solution can be deposited on a base by one of the methods standard in photoresist technique such as immersion, spraying and spinning-on. For spinning-on, for example, the percentage
20 of solids in the resist solution can be adjusted so that, depending on the spinning-on rate and the time limit adopted for the spinning-on operation, a coating of the desired thickness is produced. Examples of suitable base materials are: silicon, aluminium or polymeric resins,
25 silicon dioxide, doped silicon dioxide, silicon nitride, tantalum, copper, polycrystalline silicon (polysilicon), ceramic and aluminium/copper alloys.

 Accordingly, the present invention also relates to a radiation-sensitive positive-working photoresist material composed of a film base and a photoresist
30 coating situated thereon which is composed essentially of a mixture of at least one water-insoluble novolak resin or polyvinylphenyl resin, which is soluble in aqueous alkaline solution, as binder, at least one o-quinone diazide as photosensitive compound and a solvent con-
35 taining a propylene glycol alkyl ether acetate, characterised in that the coating has been prepared by predrying a mixture, the solvent of which contains a mixture of a propylene glycol (C₁-C₄)alkyl ether acetate

and a propylene glycol (C₁-C₄)alkyl ether or is composed thereof.

5 The photoresist solutions are suitable, in particular, for application to silicon wafers which carry a film of thermally grown silicon dioxide such as is used in the production of microprocessors and other semiconductor components used in microelectronics. Equally, an aluminium disc with an aluminium oxide film can also be used. The film base may also be composed of different
10 polymeric resins, in particular of transparent polymers such as, for example, polyesters.

After the application of the photoresist solution to the film base, the base is subjected to a pre-drying at about 20 to 110°C. This heat treatment is carried out
15 in order to reduce the residual solvent concentration in the photoresist by evaporation and to control this so that no marked thermal decomposition of the photosensitive compound occurs during this process. In general, efforts are made to reduce the solvent content to a minimum, and this first heat treatment is therefore
20 continued until the solvent has essentially evaporated and a thin film of photoresist mixture whose thickness is about 1 μm remains behind on the film base. Preferably, the temperature during this treatment is
25 between 50 and 105°C, in particular between about 80 and 105°C. This treatment step is complete when the proportion of solvent no longer decreases appreciably. The choice of the particular temperature and time duration depends on the resist properties desired by the user, the
30 equipment used and the economically desirable coating times. In a treatment with the aid of so-called hot plates, a duration of up to 3 minutes, preferably up to 1 minute, is economically effective. For instance, the predrying can be carried out within 30 seconds at 90°C.
35 In a circulating oven, the duration of the evaporation process is between 15 minutes and 60 minutes. The film deposited loses its stickiness during the predrying and its residual solvent content is adjusted during this treatment step according to the invention to 1 to 30

percent by weight, preferably to 5 to 20 percent by weight, in particular to 8 to 12 percent by weight, in all cases based on the dry weight of the film.

5 The coated base is then exposed in a known manner by means of actinic radiation, in particular UV radiation, to an image through suitable masks, negatives, templates etc.

10 Next the film bases coated with the photoresist mixture and exposed are immersed in an aqueous alkaline developer solution. The solution is preferably intensively agitated, which may for example, be done by blowing nitrogen through. Suitable developers are, for instance, aqueous alkali metal hydroxide, ammonium hydroxide or tetramethylammonium hydroxide solutions, but
15 any other suitable developer can also be used. The bases remain in the developer bath until the photoresist in the exposed areas has been completely or at least almost completely stripped.

20 After the coated wafer has been removed from the developer solution, a thermal aftertreatment or baking treatment may be carried out in order to increase the adhesion and the chemical resistance of the film to etching solutions and other substances. The heat treatment after development may comprise an oven hardening of
25 film and base below the softening point of the film. It is carried out, for instance, at temperatures of 95 to 160°C, preferably of 95 to 150°C, in particular of 112 to 120°C. This heat treatment can also be carried out using a hotplate system; its duration is then between about 10
30 seconds and the time interval necessary to crosslink the resin. As a rule, these are (sic) about 10 to 90 seconds, preferably about 30 to 90 seconds, in particular 15 to 45 seconds. The treatment may exceed the duration of 90 seconds, but this does not, in general, lead to a further
35 improvement in the results. In a drying oven, this treatment step lasts longer. The necessary time depends on the particular precise film composition and the film base used.

For industrial applications, in particular in the

production of semiconductor components on silicon bases having a silicon dioxide film, the developed bases may be treated with a buffered etching solution based on hydrofluoric acid or with gas plasma. The photoresist mixtures according to the invention are resistant to such acid-based etching solutions and to plasma etches and guarantee an effective protection of the unexposed areas of the film base coated with the photoresist mixture.

In the following examples, the methods for producing and using mixtures according to the invention is explained in depth. These examples are not, however, intended to limit the invention in its scope in any way and they should not therefore be interpreted to the effect that they specify conditions, parameters or other values which are exclusively to be used for the practical embodiment of the invention.

Example

Resist mixtures were produced from the following constituents:

20	23.8%	of resinous binder (cresol/formaldehyde novolak);
	7.0%	of photosensitive compound (condensation product of 1,2-diazonaphthoquinone-5-sulphonyl chloride and 2,3,4-trihydroxybenzophenone; and
25	69.2%	of solvent mixture (PGME/PGMEA mixture in the mixing ratios specified in the table below).

The absorptive power of the photoresist was 1.33 ± 0.03 l/g·cm in all cases.

As a result of suitably adjusting the spinning-on speed, the mixtures were applied in a manner such that, after a predrying in a circulating oven at 90°C for 30 minutes, a film thickness of 2.0 μ m was obtained. The film thickness was determined with a Rudolf film thickness measuring instrument. Photosensitivity and contrast values were determined by means of laser interferometry and the measured values obtained were subjected to a linear regression, the regression curve being drawn

through 8 measured points.

The development was carried out in all cases with "AZ Photoresist Developer" manufactured by American Hoechst Corp., Somerville, NJ, USA which was diluted with water in a ratio of 1:1.

The examples show that, with the PGME/PGMEA mixtures, photoresist can be produced which entail a markedly reduced odour nuisance while they correspond in relation to their photosensitivity and contrast values to photoresist for whose manufacture only a single solvent, namely PGMEA, was used.

TABLE

	PGME:PGMEA ratio	Resin	Film thickness (μ m) spinning- on speed (rev/min)	Contrast	Change in the photo- sensitivity (1)%
5					
10	A. 9:1	Novolak	2.073 6000	3.5	+ 3.9
	9:1	Novolak	2.073 6000	3.5	- 3.0
	B. 1:1	Novolak	2.067 5000	3.5	+ 1.3
	1:1	Novolak	2.095 5000	3.5	- 4.5
	C. 1:9	Novolak	1.999 4250	2.9	+ 8.2
	1:9	Novolak	2.062 4250	2.9	+ 1.5
15	D. 0:1	Novolak	2.055 3750	3.7	-

(1) Comparison resist: solvent PGMEA

PS - PS example - PS comparison example . 100%
PS comparison resist



Patent claims

for the Contracting States DE, FR, GB, IT, NL and AT

1. Radiation-sensitive positive-working mixture which is composed essentially of at least one water-insoluble novolak resin or polyvinylphenol resin which is soluble in aqueous alkaline solutions, as binder, at least one o-quinone diazide as photosensitive compound and a solvent containing a propylene glycol alkyl ether acetate, characterised in that the solvent contains a mixture of a propylene glycol (C₁-C₄)alkyl ether acetate and propylene glycol (C₁-C₄)alkyl ether in a mixing ratio of between 10:1 and 1:10 or is composed thereof.
2. Radiation-sensitive mixture according to Claim 1, characterised in that the solvent contains a mixture of propylene glycol methyl ether acetate and propylene glycol methyl ether or is composed thereof.
3. Radiation-sensitive mixture according to Claim 1, characterised in that the solvent contains a mixture of a propylene glycol alkyl ether acetate and a propylene glycol alkyl ether in an amount of about 5 to 10% by weight, based on the solvent.
4. Radiation-sensitive mixture according to Claim 1, characterised in that a propylene glycol alkyl ether acetate and a propylene glycol alkyl ether are present in a mixing ratio of about 1:1 parts by weight.
5. Radiation-sensitive positive-working photoresist material composed of a film base and a photoresist coating situated thereon which is composed essentially of a mixture of at least one water-insoluble novolak resin or polyvinylphenol resin, which is soluble in aqueous alkaline solutions, as binder, at least one o-quinone diazide as photosensitive compound and a solvent containing a propylene glycol alkyl ether acetate, characterised in that the coating has been prepared by predrying a mixture which contains a mixture of a propylene glycol (C₁-C₄)alkyl ether acetate and a propylene glycol (C₁-C₄)alkyl ether in a mixing ratio of between 10:1 and 1:10 or is composed thereof.



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Patentansprüche für die Vertragsstaaten: CH, LI

1. Strahlungsempfindliches positiv-arbeitendes Gemisch, das im wesentlichen aus mindestens einem wasserunlöslichen, in wäßrig-alkalischen Lösungen löslichen Novolak- oder Polyvinylphenolharz als Bindemittel, mindestens einem o-Chinondiazid als lichtempfindlicher Verbindung und einem Propylenglykolalkyletheracetat enthaltendem Lösemittel besteht, dadurch gekennzeichnet, daß das Lösemittel ein Gemisch aus Propylenglykol-(C₁-C₄)-alkyletheracetat und Propylenglykol-(C₁-C₄)-alkylether enthält oder daraus besteht.
2. Strahlungsempfindliches Gemisch nach Anspruch 1, dadurch gekennzeichnet, daß das Lösemittel ein Gemisch aus Propylenglykolmethyletheracetat und Propylenglykolmethylether enthält oder daraus besteht.
3. Strahlungsempfindliches Gemisch nach Anspruch 1, dadurch gekennzeichnet, daß das Lösemittel ein Gemisch aus Propylenglykolalkyletheracetat und Propylenglykolalkylether in einer Menge von etwa 5 bis 100 Gewichtsprozent, bezogen auf das Lösemittel, enthält.
4. Strahlungsempfindliches Gemisch nach Anspruch 1, dadurch gekennzeichnet, daß Propylenglykolalkyletheracetat und Propylenglykolalkylether in einem Mischungsverhältnis von etwa 1 : 1 Gewichtsanteilen vorhanden sind.
5. Strahlungsempfindliches, positiv-arbeitendes Photoresistmaterial aus einem Schichtträger und einer darauf befindlichen Photoresistbeschichtung, die im wesentlichen aus einem Gemisch von mindestens einem wasserunlöslichen, in wäßrig-alkalischen Lösungen löslichen Novolak- oder Polyvinylphenolharz als Bindemittel, mindestens einem o-Chinondiazid als lichtempfindlicher Verbindung und einem Propylenglykolalkyletheracetat enthaltendem Lösemittel besteht, dadurch gekennzeichnet, daß die Beschichtung durch Vortrocknen eines Gemisches hergestellt wurde, dessen Lösemittel ein Gemisch aus Propylenglykol-(C₁-C₄)-alkyletheracetat und Propylenglykol-(C₁-C₄)-alkylether enthält oder daraus besteht.

Claims for the contracting states: DE, FR, GB, IT, NL, AT

1. Radiation-sensitive positive-working mixture which is composed essentially of at least one water-insoluble novolak resin or polyvinylphenol resin which is soluble in aqueous alkaline solutions, as binder, at least one o-quinone diazide as photosensitive compound and a solvent containing propylene glycol alkyl ether acetate, characterized in that the solvent contains a mixture of propylene glycol (C₁-C₄)alkyl ether acetate and propylene glycol (C₁-C₄)alkyl ether in a mixing ratio of between 10:1 and 1:10 or is composed thereof.
2. Radiation-sensitive mixture according to Claim 1, characterized in that the solvent contains a mixture of propylene glycol methyl ether acetate and propylene glycol methyl ether or is composed thereof.
3. Radiation-sensitive mixture according to Claim 1, characterized in that the solvent contains a mixture of propylene glycol alkyl ether acetate and propylene glycol alkyl ether in an amount of about 5 to 100% by weight, based on the solvent.
4. Radiation-sensitive mixture according to Claim 1, characterized in that propylene glycol alkyl ether acetate and propylene glycol alkyl ether are present in a mixing ratio of about 1:1 parts by weight.
5. Radiation-sensitive positive-working photoresist material composed of a film base and a photoresist coating situated thereon which is composed essentially of a mixture of at least one water-insoluble novolak resin or polyvinylphenol resin, which is soluble in aqueous alkaline solutions, as binder, at least one o-quinone diazide as photosensitive compound and a solvent containing propylene glycol alkyl ether acetate, characterized in that the coating has been prepared by predrying a mixture the solvent of which contains a mixture of propylene mixture, the solvent of which contains glycol (C₁-C₄)alkyl ether acetate and propylene glycol (C₁-C₄)alkyl ether in a mixing ratio of between 10:1 and 1:10 or is composed thereof.

Claims for the contracting states: CH, LI

1. Radiation-sensitive positive-working mixture which is composed essentially of at least one water-insoluble novolak resin or polyvinylphenol resin which is soluble in aqueous alkaline solutions, as binder, at least one o-quinone diazide as photosensitive compound and a solvent containing propylene glycol alkyl ether acetate, characterized in that the solvent contains a mixture of propylene glycol (C₁-C₄)alkyl ether acetate and propylene glycol (C₁-C₄)alkyl ether or is composed thereof.
2. Radiation-sensitive mixture according to Claim 1, characterized in that the solvent contains a mixture of propylene glycol methyl ether acetate and propylene glycol methyl ether or is composed thereof.
3. Radiation-sensitive mixture according to Claim 1, characterized in that the solvent contains a mixture of propylene glycol alkyl ether acetate and propylene glycol alkyl ether in an amount of about 5 to 100% by weight, based on the solvent.
4. Radiation-sensitive mixture according to Claim 1, characterized in that propylene glycol alkyl ether acetate and propylene glycol alkyl ether are present in a mixing ratio of about 1:1 parts by weight.
5. Radiation-sensitive positive-working photoresist material composed of a film base and a photoresist coating situated thereon which is composed essentially of a mixture of at least one water-insoluble



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novolak resin or polyvinylphenol resin, which is soluble in aqueous alkaline solutions, as binder, at least one o-quinone diazide as photosensitive compound and a solvent containing propylene glycol alkyl ether acetate, characterized in that the coating has been prepared by predrying a mixture, the solvent of which contains a mixture of propylene glycol (C₁-C₄)alkyl ether acetate and propylene glycol (C₁-C₄)alkyl ether or is composed thereof.

Revendications pour les Etats Contractants: DE, FR, GB, IT, NL, AT

1. Composition sensible aux radiations, travaillant en positif, essentiellement constituée d'au moins, en tant que liant, une résine Novolaque ou polyvinylphénolique insoluble dans l'eau, soluble dans des solutions aqueuses-alcalines, d'au moins un o-quinonediazide en tant que composé photosensible, et d'un solvant contenant un acétate d'éther alkylique de propylèneglycol, caractérisée en ce que le solvant contient ou consiste en un mélange d'acétate d'éther alkylique en C₁-C₄ de propylèneglycol et d'éther alkylique en C₁-C₄ de propylèneglycol, en un rapport de mélange compris entre 10:1 et 1:10.

2. Composition sensible aux radiations selon la revendication 1, caractérisée en ce que le solvant contient ou consiste en un mélange d'acétate d'éther méthylique de propylèneglycol et d'éther méthylique de propylèneglycol.

3. Composition sensible aux radiations selon la revendication 1, caractérisée en ce que le solvant contient un mélange d'acétate d'éther alkylique de propylèneglycol et d'éther alkylique de propylèneglycol en une quantité d'environ 5 à 100% en poids, par rapport au solvant.

4. Composition sensible aux radiations selon la revendication 1, caractérisée en ce que l'acétate d'éther alkylique de propylèneglycol et l'éther alkylique de propylèneglycol sont présents en un rapport de mélange d'environ 1:1 parties en poids.

5. Matériau de photoresist sensible aux radiations, travaillant en positif, composé d'un support de couche et d'un revêtement de photoresist se trouvant sur celui-ci, essentiellement constitué d'un mélange d'au moins, en tant que liant, une résine Novolaque ou polyvinylphénolique insoluble dans l'eau, soluble dans des solutions aqueuses-alcalines, d'au moins un o-quinonediazide en tant que composé photosensible, et d'un solvant contenant un acétate d'éther alkylique de propylèneglycol, caractérisé en ce que le revêtement a été produit par pré-séchage d'une composition qui, en tant que solvant, contient ou consiste en un mélange d'acétate d'éther alkylique en C₁-C₄ de propylèneglycol et d'éther alkylique en C₁-C₄ de propylèneglycol, en un rapport de mélange compris entre 10:1 et 1:10.

Revendications pour les Etats Contractants: CH, LI

1. Composition sensible aux radiations, travaillant en positif, essentiellement constituée d'au moins, en tant que liant, une résine Novolaque ou polyvinylphénolique insoluble dans l'eau, soluble dans des solutions aqueuses-alcalines, d'au moins un o-quinonediazide en tant que composé photosensible, et d'un solvant contenant un acétate d'éther alkylique de propylèneglycol, caractérisée en ce que le solvant contient ou consiste en un mélange d'acétate d'éther alkylique en C₁-C₄ de propylèneglycol et d'éther alkylique en C₁-C₄ de propylèneglycol.

2. Composition sensible aux radiations selon la revendication 1, caractérisée en ce que le solvant contient ou consiste en un mélange d'acétate d'éther méthylique de propylèneglycol et d'éther méthylique de propylèneglycol.

3. Composition sensible aux radiations selon la revendication 1, caractérisée en ce que le solvant contient un mélange d'acétate d'éther alkylique de propylèneglycol et d'éther alkylique de propylèneglycol en une quantité d'environ 5 à 100% en poids, par rapport au solvant.

4. Composition sensible aux radiations selon la revendication 1, caractérisée en ce que l'acétate d'éther alkylique de propylèneglycol et l'éther alkylique de propylèneglycol sont présents en un rapport de mélange d'environ 1:1 parties en poids.

5. Matériau de photoresist sensible aux radiations, travaillant en positif, composé d'un support de couche et d'un revêtement de photoresist se trouvant sur celui-ci, essentiellement constitué d'un mélange d'au moins, en tant que liant, une résine Novolaque ou polyvinylphénolique insoluble dans l'eau, soluble dans des solutions aqueuses-alcalines, d'au moins un o-quinonediazide en tant que composé photosensible, et d'un solvant contenant un acétate d'éther alkylique de propylèneglycol, caractérisé en ce que le revêtement a été produit par pré-séchage d'une composition qui, en tant que solvant, contient ou consiste en un mélange d'acétate d'éther alkylique en C₁-C₄ de propylèneglycol et d'éther alkylique en C₁-C₄ de propylèneglycol.