Photoresist Removal

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Dissolubility of Processed Photoresist Films

Non cross-linked AZ® and TI photoresists can be removed easily and residual-free from the substrate in many common strippers. If not, one or more of the following reasons decreasing the removableness of resist films have to be considered:

- From temperatures of approx. 150°C on (e. g. during a hardbake, dry etching, or coating), positive photoresists cross-linking thermally activated. If applicable, the temperatures should be lowered.
- Cross-linking also takes place optically activated under deep-UV radiation (wavelengths < 250 nm) in combination with elevated temperatrues which occurs during evaporation or sputtering of coatings, or dry-etching.
- The desired crosslinking of negative resists is enhanced during any subsequent process steps with elevated temperatures, and the resist removal might become difficult.
- Material re-deposited on the resist structures during dry etching will also make it difficult to remove the resist film.

Using Solvents as Remover

Acetone is not well-suited as stripper for photoresists: The high vapour pressure of acetone causes a fast drying and thus re-deposition of stripped photoresist onto the substrate forming striations. If nevertheless acetone shall be used for this purpose, a subsequent rinse with isopropyl alcohol - immediately after the acetone step - is recommended in order to remove the resist-contaminated acetone residual-free.

NMP (1-Methyl-2-pyrrolidon) is a powerful stripper due to its physical properties: NMP yields a low vapour pressure (no striation formation), strongly solves organic impurities as well as resists, keeps the removed resist in solution, and can be heated to 80°C due to its high boiling point. However, since NMP is classified as toxic and teratogenic, a recommended alternative ist ...

DMSO (Dimethyl sulfoxide) has a performance as photoresist stripper comparable to the performance of NMP, and is a kind of "safer-solvent" substitute for NMP. We already have high-purity DMSO in our product range, please contact us for the specifications or/and a free sample!

Alkaline Solutions as Remover

If the alkaline stability of the substrate is high enough, aqueous alkaline solutions such as 2-3 % KOH or NaOH (= typical developer concentrates) can be used as remover. For highly cross-linked resists, higher concentrations or/and elevated temperatures might be required.

It has to be considered that many metals (Al, Cu ...) are not sufficiently alkaline stable, and also crystalline silicon will be attacked at high pH-values and temperatures.

AZ® 100 Remover

AZ® 100 Remover is an amine-solvent mixture, and a ready-to-use standard remover for AZ® and TI photoresists. In order to improve its performance, AZ® 100 Remover can be heated to 60°C.

Since AZ® 100 Remover is strongly alkaline, aluminium containing substrates might be attacked as well as copper- or GaAs alloys/compounds. In this case, AZ® 100 Remover should be used as concentrate, any dilution or contamination (even in traces!) of AZ® 100 Remover with should be avoided.

O_2-Combustion

If a photoresist film cannot be removed wet-chemically due to its high degree of cross-linking, or dry etching is generally preferred, an O_2-plasma will act as suited stripper for even highly cross-linked resists.

Our Removers

NMP and **DMSO** as well as many other **organic solvents** from 2.5 L units on in VLSI quality,

AZ® 100 Remover in 5 L units, and

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Disclaimer of Warranty

All information, process guides, recipes etc. given in this brochure have been added to the best of our knowledge. However, we cannot issue any guarantee concerning the accuracy of the information.

We assume no liability for any hazard for staff and equipment which might stem from the information given in this brochure.

Generally speaking, it is in the responsibility of every staff member to inform herself/himself about the processes to be performed in the appropriate (technical) literature, in order to minimize any risk to man or machine.