

Titanium Nitride Hard Mask and Etch Residue Removal

ABSTRACT OF THE DISCLOSURE

5 Formulations for stripping titanium nitride(TiN or TiN_xO_y ; $x = 0$ to 1.3 and $y = 0$ to 2) hard
mask and removing titanium nitride etch residue are low pH (<4) comprise a weakly
coordinating anion having negative charge highly dispersed throughout its structure,
amine salt buffer, a non-oxidizing trace metal ion, a non-ambient trace oxidizer, and the
remaining being solvent selected from the group consisting of water, sulfolane, dimethyl
10 sulfide, lactic acid, glycol, and mixtures thereof. The formulations contain no hydrogen
peroxide, and are exposed to air. Bifluoride, corrosion inhibitors, surfactants may be
added to the formulations. Systems and processes use the formulations for stripping
titanium nitride hard mask and removing titanium nitride etch residue.

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