

TitanKlean® W

*Tungsten compatible post-etch residue
and hard mask removal solutions*

As pattern geometries become increasingly smaller and more complex, removing the metal hard mask during the post-etch residue removal process becomes more desirable. The major roadblock to implementing this step previously has been the incompatibility of potential mask removal chemistries with other materials that are present. In some cases, these materials are very similar to the hard mask material itself, adding complexity to an already difficult challenge. TitanKlean® W was designed to enable this step while also delivering significant cost savings.

TitanKlean W formulated solutions provide one-step, hard mask removal and post-etch clean and are compatible with W metallization and exposed thin films materials. By reducing effective aspect ratio, these solutions simplify subsequent copper deposition processes resulting in significant improvements in electromigration and time dependent dielectric breakdown (TDDB) performance.



FEATURES & BENEFITS

- Improved yield
 - Removal of hard mask results in improved reliability
 - Enhanced residue removal capability
- Reduced cost of ownership
 - Improved stability of chemistry allows for recycling if desired
- Operation
 - Designed for operation in all single-wafer tool platforms
 - Standard operating temperature from room temperature to 60°C (140°F)
- Compatible with advanced dielectric films down to $K=2.4$
- High TiN rate >100
- Low W etch rate, <1 Å/min for all films
- Good post-etch residue removal
- Excellent bath life and wafer loading capability

SPECIFICATIONS

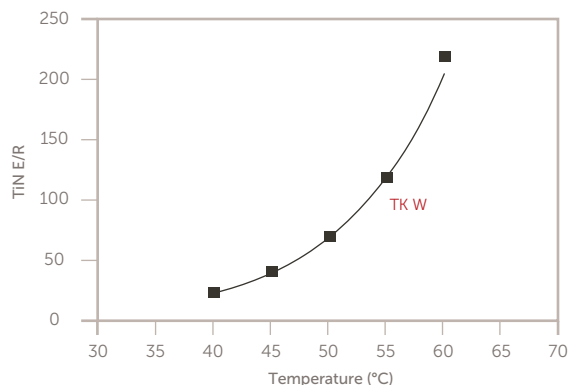
Physical state	Liquid
Color	Colorless
Odor	Odorless
pH	0.5 – 2
Boiling point	>100°C (212°F)
Density	1.006 g/mL
Water solubility	Soluble
Specific gravity (water=1)	1.006
Viscosity	1 – 1.2 cP @ 25°C (77°F)

Etch Rate, Å/min, at 50°C (122°F)

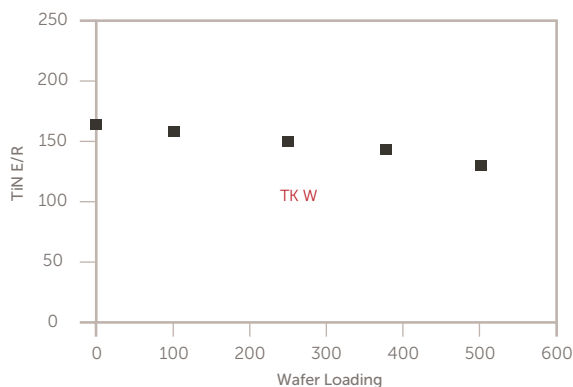
Formulations	TK10-X4
Temperature	50°C (122°F)
TiN E/R	117
W E/R	<0.5
PETEOS E/R	<0.3
LTO E/R	1.4
TEOS E/R	<0.3
dOSG E/R	2.0
BDIII E/R	0.6

PERFORMANCE DATA

TiN Multi-Temp E/R



TiN E/R @ 60°C vs. Wafer Loading



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