TechniEtch TBR19

High-Performance Etchant

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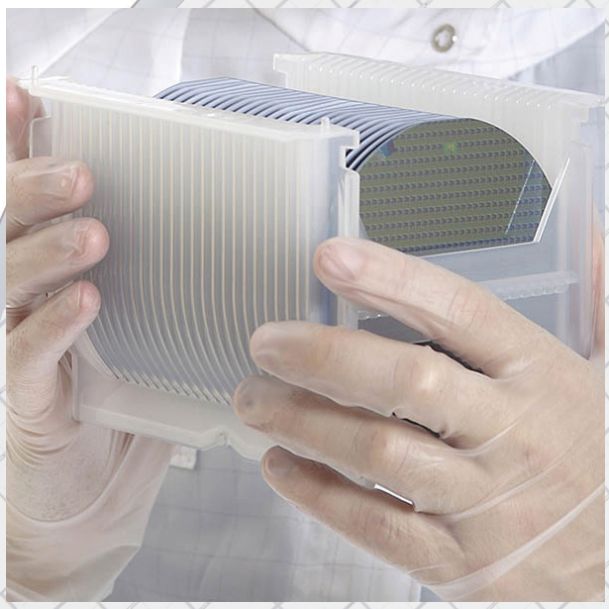
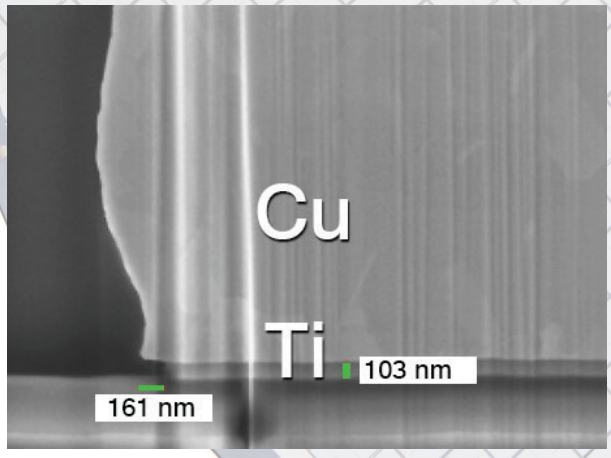
Highly Selective Metal Etchant for Titanium and Titanium Alloy Seed Layers

Titanium and titanium alloys are widely used in advanced packaging as adhesion and barrier seed layers. With FOWLP, Flip Chip, 2.5/3D and other technologies continuing to require increased functionality with smaller feature sizes, traditional metal etchants are reaching their limitations.

DHF, SC1, and pure H_2O_2 have been used for many years to etch titanium and titanium alloys. These traditional chemistries suffer from inconsistent etch rates, excessive undercuts, and low compatibility with metal stacks, and they are difficult to control. Because of these weaknesses, legacy chemistries cannot meet the current requirements of advanced packaging companies.

Working closely with our industry leading customers, Technic has successfully formulated a high-level metal etchant chemistry that eliminates many of the weaknesses of traditional titanium and titanium alloy etchants. TechniEtch TBR19 is a stabilized hydrogen peroxide based metal etchant that is extremely selective with a very low undercut value of < 0.2 microns.





Ti undercut < 0.2µm with overetch of 50%

Features

- Excellent selectivity
- Low undercut
- Improved etch uniformity
- Stable and consistent etch rate over the life of the bath
- Fluoride-free aqueous solution
- Compatible with most UBM and copper pillar integration materials
- Fully compatible with aluminum
- Tunable etch rate

Benefits

- High selectivity and low undercut provides high yields with fine pitch patterns
- Reduced cost of operation through extended bath life
- High process efficiency through stable chemistry and consistent etch rate
- Wide process operating window – 50% process overetch still results in minimal undercut

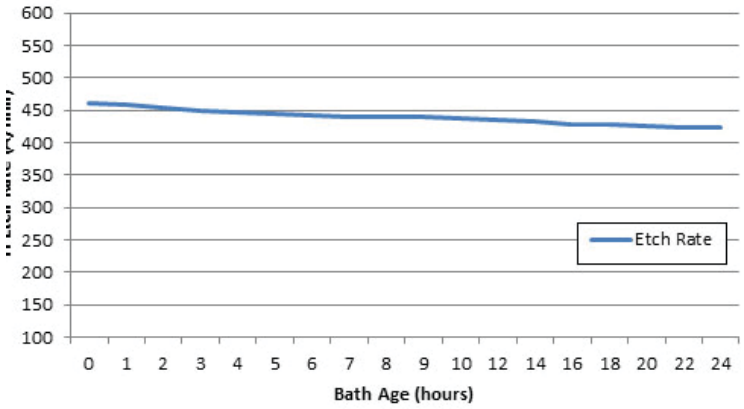
TechniEtch TBR19 - High Performance Etchant

High Metal Selectivity

Standard Etch Rate at 50°C on full blanket substrates

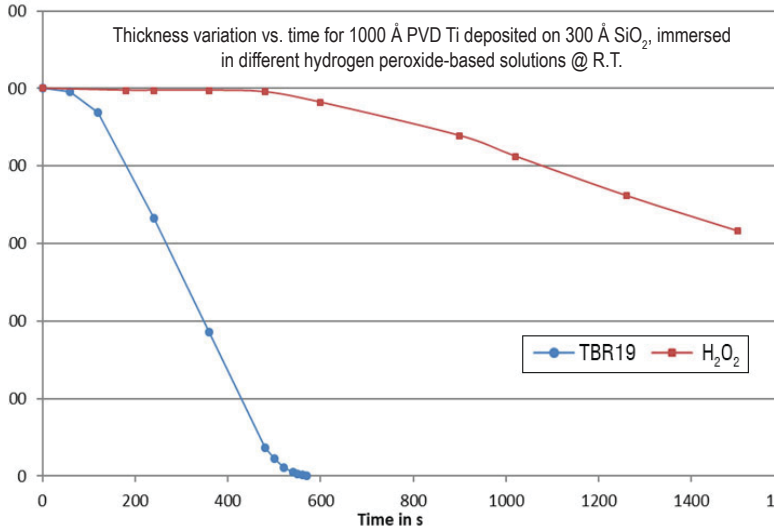
Substrate	Etch Rate (Å/min)
TiN PVD	1500
Ti PVD	1800
Cu ECD	< 10
Sn ECD	< 10
Al PVD	< 10
Ni ECD	< 10

Etch Rate vs. Bath Age



Less than 10% reduction in etch rate at 50°C in a single wafer tool

Etch Rate of Ti Alloys – TBR19 vs. H_2O_2



Ti native oxide (TiO_2) dramatically reduces the Ti etch rate in pure H_2O_2. The excellent dissolution of TiO_2 in TBR19 enhances and promotes a fast etch rate throughout the process, leading to better etching uniformity and process control.

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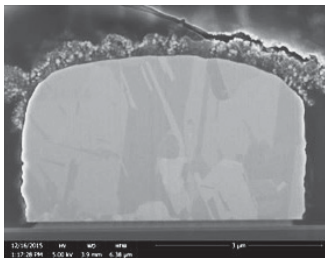
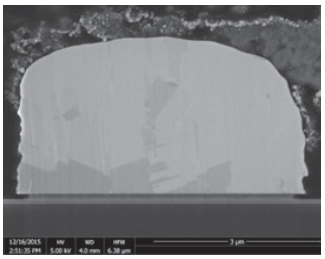
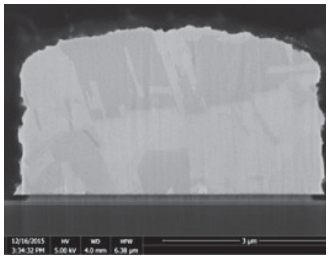
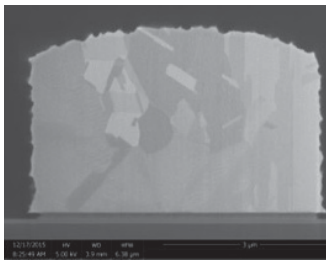
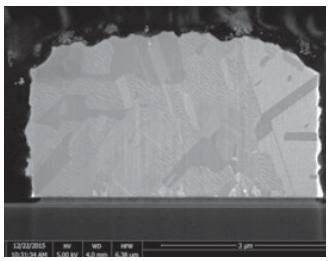
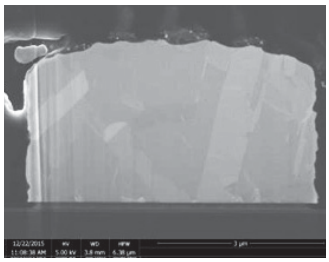
Low undercut achieved after removal of 2000 Å of Ti from 300 mm wafer

Bath Age (hours)	TechniEtch TBR19 (Undercut)
0	 0.19 µm
2	 0.22 µm
4	 0.27 µm
6	 0.22 µm
8	 0.16 µm
24	 0.17 µm