

# TechniEtch TBR19 concentrate

## for POU Process

Mixing procedure - Rev 2

2

### Product Application

TechniEtch TBR19 is an enabling” Point of use POU fluoride free aqueous solution, designed to selectively dissolve Titanium and alloys (Ti, TiN, TiW) based barriers for far back end of the line interconnect applications. The solution is compatible with most UBM, and copper pillar integration materials such as Cu, Al, Ni, Sn & alloys, Glass, organic substrate, etc.

### Standard TechniEtch TBR19 POU mixture

- Blend ingredients in a vessel equipped with agitation, blowhole
  - See material compatibility
  - For sampling (<1 gallon), ingredient can be mixed up within the bottles itself while following the mixing instructions hereafter.
- Recommended Mixing Temperature: 10-25°C
- Add slowly (around 0.5 liter per minute for 50 liters) under agitation the TBR19 concentrate additive into the peroxide solution (30wt%) in the following proportions:
- TechniEtch TBR19 POU is made of
  - 94 Wt % H2O2 SLSI grade (30-31%)
  - 6 Wt % TBR19 concentrate additives

-The stirring should be pursued for an extra couple of minutes after addition of the TRBR19 POU

-Check pH (see specification)

If no bubbling and pH on spec you can use the solution or package it

- TBR19 mixture bottles should be capped only with pressure release cap.

- The solution TechniEtch TBR19 mixture can be used as such.

### Ti/TiN/TiW etching

-Pour the solution into the equipment tank/vessel

- The tool should have been carefully and properly cleaned up (organic and metal contamination free) to prevent any fast decomposition and/or alteration of its bath life of the mixture.

Make sure that all pipes, tank, chamber would be free of contaminant, water included.

Apply a quick rinse with H2O2 30Wt% and or TBR19 POU to condition the tool prior to fill the tank and start the experiments.

-Heat up solution according to your process recipe from 35 to 50C

-The equipment should be fitted with appropriate safety set up and devices to work with concentrated hydrogen peroxide.

- The solution should not be used over 5 hours @50°C for initial testing

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2

Etch rate of Ti and alloys is dependent of set up and can be adjusted with agitation/rotation/temperature/flow...

Etch rate @ 50°C is from 250 to 1000A/min depending on metal, stack, film stress, deposition methods.

TiW etch process may require to dilute the TBR19 mixture two to threefold to achieve better control feature undercut.

- Bleed and feed, fill and drain can be used depending on process specifications, metal loading and number of wafers processed at once.

-used on single wafer, batch spray and immersion tool platforms.

- Equipment should be fitted with blowhole or alternative pressure release devices similar to the use of standard peroxide mixtures.

### Material compatibility

TechniEtch TBR19 is compatible with most plastics: Polypropylene, HDPE, PFA, PTFE Kalrez, PEEK, PE.

Perfluoro-elastomers like CHEMRAZ®, KALREZ®, SIMRIZ® or PFA encapsulated VITON® for wetted O'rings.

Incompatibility with Sn/Pb based bump.

### Process control parameters

TBR19 destabilization root causes

- Shelflife
  - TBR19 **mixture** should not be stored over 6 month @ 20°C, preferably 6 months @ 15°C
  - TBR19 **concentrate** can be stored for 1 year @ RT
- **TBR19 Mixture** Ageing factors-
  - Prevent high exhaust flow
  - Bath life (recycling)
    - @50C, 5 hours
    - @35C, 5 days
  - Maximum Metal content load in solution:
    - 4 wafer12" with Ti 150nm/ liter of TBR19 mixture @ 50C (<200ppm in Ti)
    - 4 wafer12" with TiW 100nm/ liter of TBR19 mixture @ 50C (<250ppm in W)
  - Cross/Contamination of the bath with organic / metal
  - Mixing procedure – respect the proportion
    - pH > 8 should be avoided
- **Waste**
  - Always Destroy the mixture after usage-
    - Do ever rebottle activated/used mixture

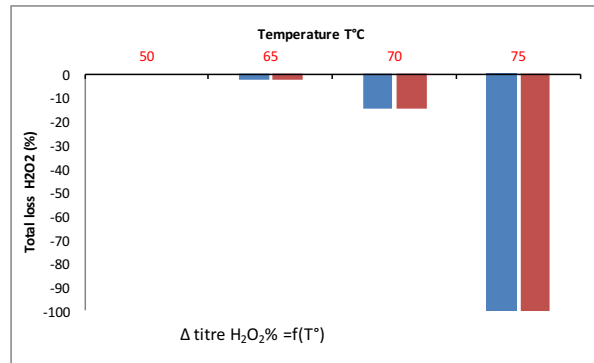
# TechniEtch TBR19 concentrate

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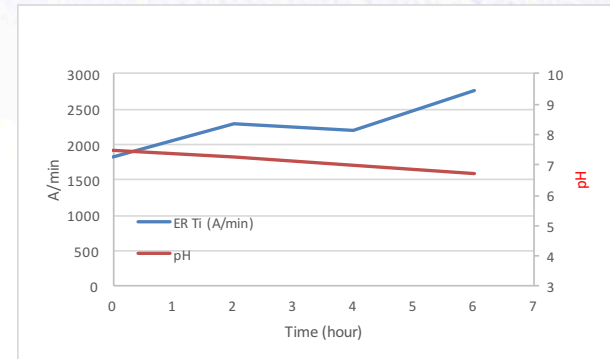
Mixing procedure - Rev 2

- Drain in H<sub>2</sub>O<sub>2</sub> drain or acid drain
- Can add H<sub>3</sub>PO<sub>4</sub> to neutralize alkalinity prior to disposal

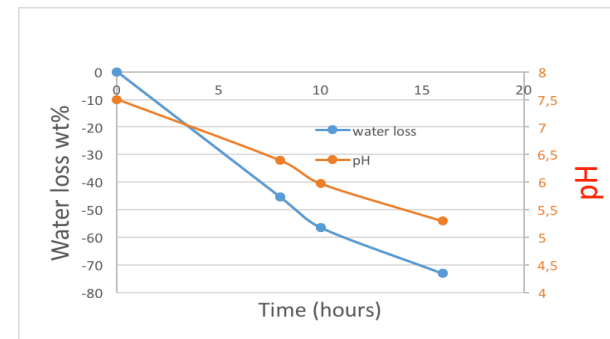
### • Complementary data on stability and solution behavior.



- H<sub>2</sub>O<sub>2</sub> loss over 16 hours of the bath with T
  - Monitoring of peroxide decomposition at different temperature by gasometry and potentiometry (metal free)



- Stability of the bath @ 50C
  - ER change <10%
  - pH <0,5 unit



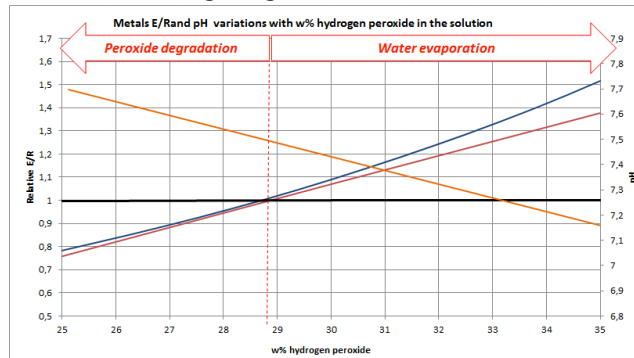
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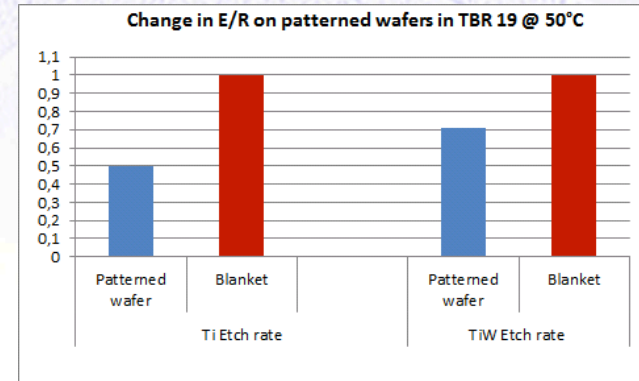
Mixing procedure - Rev 2

- pH and water loss monitoring with bath ageing @ 50C
  - Water loss due to extraction and heating
  - pH drop due to peroxide decomposition

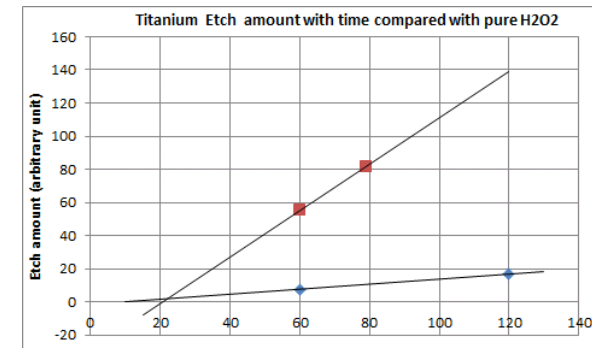
- ER Vs bath ageing



- Impact of Peroxide content on pH and ER of the bath
  - Through water evaporation
  - H<sub>2</sub>O<sub>2</sub> decomposition



- ER Vs blanket and patterned wafers



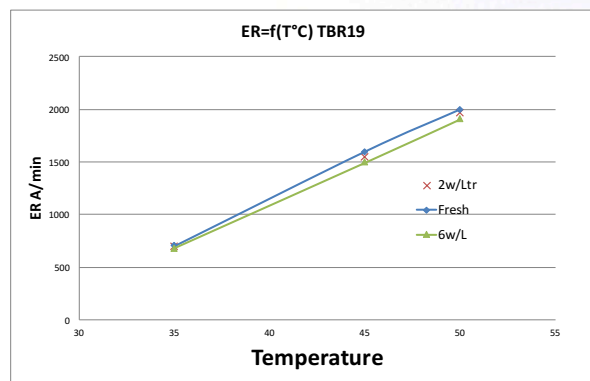
- Ti ER comparison btw TBR19 and pure H<sub>2</sub>O<sub>2</sub>(30wt%)

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2



- ER Vs Metal bath loading & temperature
  - 1 wafer @ the time to limit heat generation and heavy bubbling

### Physico-Chemical properties

State: Uncolored to light yellow liquid	Viscosity (20°C): 1 cP
Odor: No odor	Concentrate pH: >8
	Mixture 7,4<pH<7,8
T°C Flash point: NA	T°C boiling:
100°C	
Water Solubility: Fully miscible	Density: 1.1
Chemical property: highly oxidative	

TechniEtch TBR19 concentrate is formulated using high quality raw materials to ensure low metal and particulate level contamination. The full manufacturing process is in accordance with the company quality policy.

### Health, Safety and Environment - Storage

TechniEtch TBR19 concentrate is classified according to the CLP regulation, it is recommended to wear appropriate gloves and safety glasses when handling the product.

To obtain comprehensive information on the safe use and handling of the TechniEtch TBR19, concentrate a material safety data sheet and an additional information package are available on request.

<b>Storage conditions</b>	<b>0-25°C</b>
<b>Shelf life TBR19 concentrate</b>	<b>12months</b>

**Technic' safety policy is to optimize and promote safer chemical to the industry in accordance to latest European regulation and Customer' chemical banned substance list.**

### Waste treatment

- Used solution should be treated as peroxide based chemistries (SC1, SC2, APM...)
  - Compatible with acidic and or peroxide based drains

### Quality



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- Compatible with standard peroxide waste post-treatment
- Do not segregate used solution waste in sealed drums
  - without vented cap
  - without diluted two to threefold with water
  - without neutralized with addition of 10% H<sub>3</sub>PO<sub>4</sub> (70%) or decomposition on iron wool

### ***Packaging size***

From 5 liters cans to 200 liters' drums.

### ***Contact***

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