Brewer Science® ProTEK® PSB

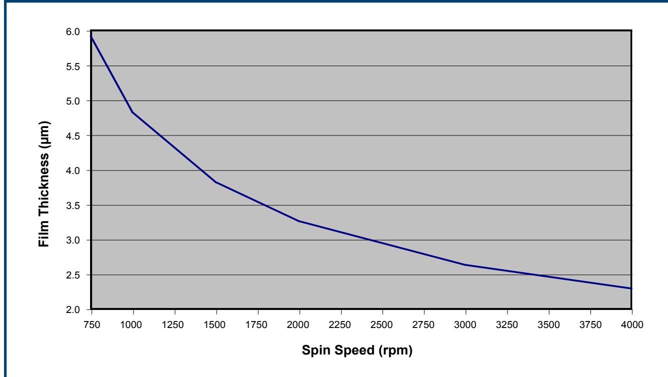
Photosensitive Alkaline-Resistant Protective Coating

Brewer Science® ProTEK® PSB coating is a negative-working photosensitive alkaline-resistant etch mask that allows bulk silicon micromachining late in the device fabrication process while preserving the metal stack.

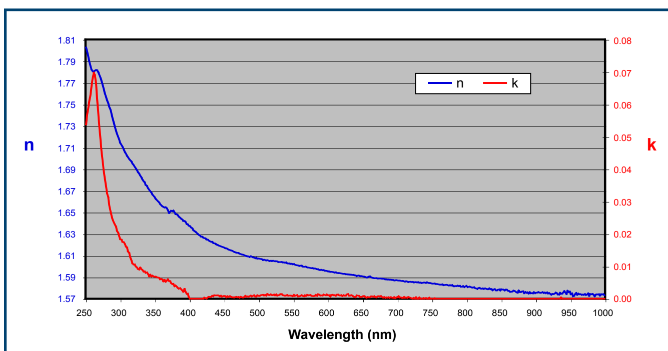
Benefits

- Apply over CMOS structures at low process temperatures
- Shorten processing time compared to SiN etch masks
- Provide higher throughput than single-wafer deep reactive ion etching by using batch processing

ProTEK® PSB-23 Coating Spin Speed Curve



ProTEK® PSB Coatings n & k Spectra



Processing Steps

Wafer Pretreatment (RCA 1 & RCA 2 Cleaning)

First Bath: NH_4OH:H_2O_2:DI water (1:1:40) for 15 min at room temperature followed by DI water rinse at room temperature for 5 min
Second Bath: HCl:H_2O_2:DI water (1:1:40) for 15 min at room temperature followed by DI water rinse at room temperature for 5 min
Spin rinse dry or dry wafers in oven at 70°C for ~ 2 hours

Process Parameters

ProTEK® PSB Primer (developmental) Coating Guidelines
Spin Coat: 1000 rpm for 60 s,
Acceleration: > 1000 to 10,000 rpm/s
First Bake (hot plate): 110°C for 60 s
Second Bake (hot plate): 220°C for 5 min

ProTEK® PSB Protective Coating Guidelines
Rinse wafer thoroughly with PGMEA and spin dry before applying ProTEK® PSB coating
Spin Coat ProTEK® PSB coating: 1500 rpm for 60 s,
Acceleration: > 5000 rpm/s
Bake (hot plate): 110°C for 120 s

Exposure Guidelines (negative working)
Exposure Dose: 500 mJ/cm^2 i-line or broadband
Post-Exposure Bake: 110°C for 120 s

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Development Guidelines

Spin Dispense or Spray (ethyl lactate):* 300 rpm for 10 s,
Acceleration: 1000 rpm/s
Spin Dry: 2000 rpm for 5 s,
Acceleration: 10,000 rpm/s
Repeat above development steps 2 to 4 times, as necessary

Spin Dispense or Spray (DI water or IPA): 300 rpm for 8 s,
Acceleration: 1000 rpm/s
Spin Dry: 2000 rpm for 40 s,
Acceleration: 1000 rpm/s

Post-Development Guidelines

Post-Development Bake (hot plate): 220°C for 180 s

Etch in TMAH or KOH per customer process requirements

For optimal undercut performance:
Recommended KOH bath temperature: ~ 75°C
Recommended TMAH bath temperature: ~ 90°C

Removal Guidelines

Recommended Dry Removal Process

1) Etch bulk film with O_2 plasma, 75 sccm O_2, 400 W, 75 mTorr
2) Etch with O_2:CF_4 (2:1), 56 sccm O_2, 19 sccm CF_4, 400 W, 100 mTorr

Recommended Wet Removal Process

1) Immerse wafers coated with ProTEK® PSB coating in Nano-Strip® from Cyantek** for 30 minutes at 100°C
2) Rinse with DI water and dry

Storage Conditions

ProTEK® PSB Coatings: Room temperature (16°C to 26°C)
ProTEK® PSB Primer: Room temperature (16°C to 26°C)

Shelf Life

ProTEK® PSB Coatings: 365 days
ProTEK® PSB Primer (developmental): 270 days
(When stored at conditions stated above)

Ethyl lactate is not supplied by Brewer Scinece, Inc. Please contact your local chemical supplier for details on purchasing this material.
***Nano-Strip® is manufactured and distributed by Cyantek. To purchase Nano-Strip®, please contact Cyantek at www.cyantek.com or phone +011.510.651.3341*

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