

Brewer Science® ProTEK® PSB

Photosensitive Alkaline-Protective Coating



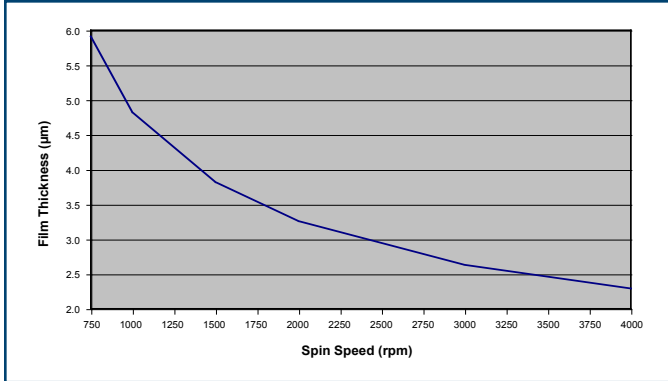
brewer science

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

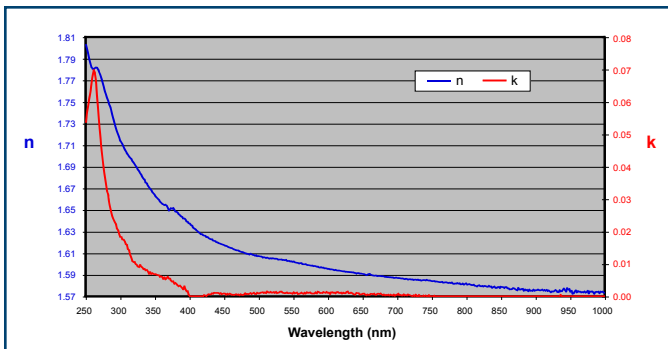
Benefits

- ▶ Apply over CMOS structures at low process temperatures
- ▶ Reduce processing time compared to SiN etch masks
- ▶ Provide higher throughput than single-wafer DRIE 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: $\text{NH}_4\text{OH}:\text{H}_2\text{O}_2:\text{DI water}$ (1:1:40) for 15 min at room temperature followed by DI rinse at room temperature for 5 min
Second Bath: $\text{HCl}:\text{H}_2\text{O}_2:\text{DI water}$ (1:1:40) for 15 min at room temperature followed by DI rinse at room temperature for 5 min
Spin rinse dry or dry wafers in oven at 70°C for ~ 2 hours

Process Parameters

ProTEK® PS Primer 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

Spin Coat: 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/cm² i-line or broadband
Post-Exposure Bake: 110°C for 120 s

Guidelines continued on page 2

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 O₂ plasma (75 sccm O₂, 400 W, 75 mTorr)
- 2) Etch with O₂:CF₄ (2:1), (56 sccm O₂, 19 sccm CF₄, 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® PS Primer: Refrigerate (-5°C to 1°C)

Shelf Life

ProTEK® PSB Coatings: 365 days

ProTEK® PS Primer: 90 days

(When stored at above recommended conditions)

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