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H.A.R.E. SQ Negative Tone Photoresist

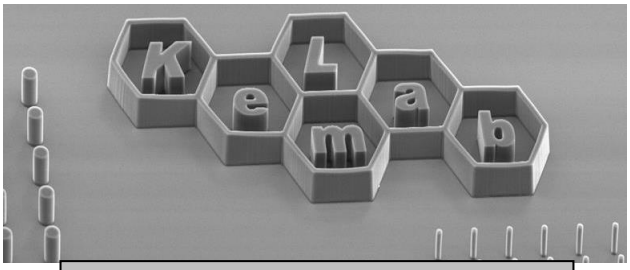
High Aspect Ratio Epoxy / Superior Quality

Description:

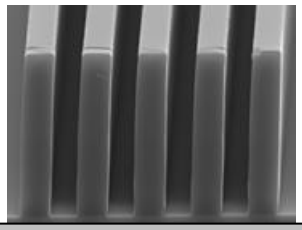
HARE-SQ is an epoxy based negative photoresist designed for polymeric MEMS, microfluidics, micromachining and other microelectronic applications. The HARE-SQ system is designed for use in thick film applications of 2 to 100 microns, and is ideal for use in permanent applications in which the photoresist remains within the finished device.

Advantages:

- The HARE-SQ photoresist uses an epoxy resin with superior cleanliness and excellent reproducibility
- Consistent surface energy of crosslinked resist, (an important property for microfluidic applications).
- Fully compatible with SU-8 processes.



Logo & posts in 50 μm film



5 μm dense line/space in 25 μm film

Process Guide

Product: / Film Thickness @ 2000 rpm	SQ-2 2 μm	SQ-5 5 μm	SQ-10 10 μm	SQ-25 25 μm	SQ-50 50 μm
Softbake (2 step)	65°C for 1 min 95°C for 1 min	65°C for 1 min 95°C for 3 min	65°C for 2 min 95°C for 5 min	65°C for 3 min 95°C for 7 min	65°C for 5 min 95°C for 15 min
Expose (broadband) on Si	200 mJ/cm^2	180 mJ/cm^2	180 mJ/cm^2	180 mJ/cm^2	180 mJ/cm^2
Post Exposure Bake (2 step)	65°C for 1 min 95°C for 1 min	65°C for 1 min 95°C for 1 min	65°C for 2 min 95°C for 2 min	65°C for 3 min 95°C for 3 min	65°C for 1 min 95°C for 4 min
Develop (immersion)	1 minute	1 minute	2.5 minutes	3.5 minutes	6 minutes

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Substrate

HARE SQ adheres to variety of substrates; including silicon, gold, aluminum, chromium and copper. Proper substrate cleaning & dehydration improve adhesion.

Coat

Spin Coat: Film Thickness is targeted using the spin speed curve (shown at right). The coat program uses a 5 - 10 second spread cycle. Spin time at final speed is 30 seconds.

Coat techniques such as spray coat, slot coating, and other additive techniques are possible; please contact KemLab for more information.

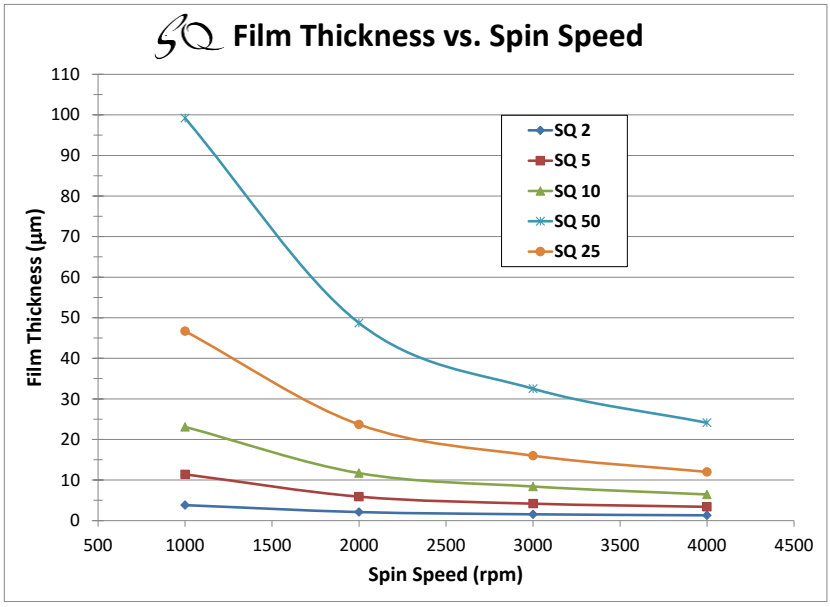
Soft Bake

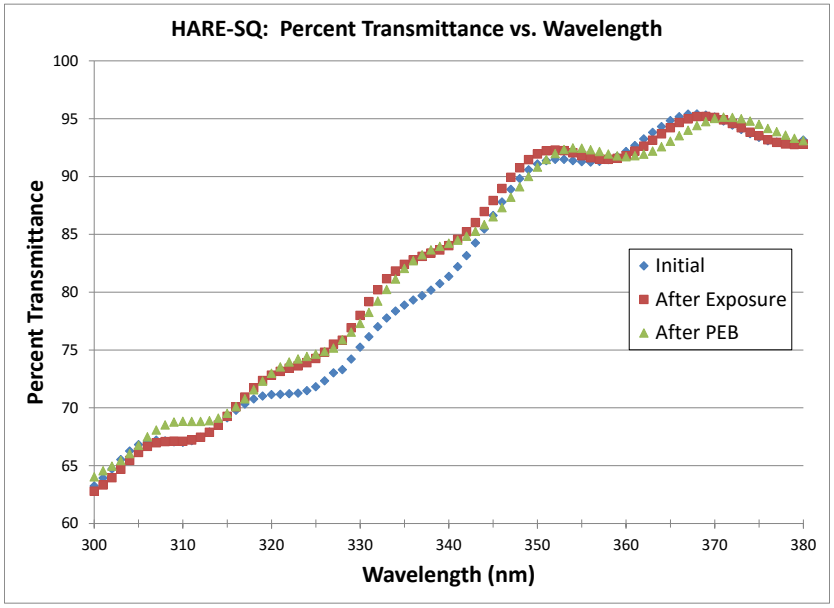
The recommended softbake for the HARE-SQ utilizes a two-step bake on a contact hot plate in order to minimize film stress and adhesion issues.

See Process Guide Table (front page) for details.

Exposure & Optical Parameters

HARE-SQ is designed for near UV (300-400nm) exposure wavelengths. Exposure dose will vary depending on the exposure tool set, film thickness, and process conditions. Nominal exposure doses are shown in the Process Guide for broadband exposure with a 360nm cutoff filter at the thicknesses and processes shown.





Post-Exposure Bake (PEB)

Recommended PEB time is adjusted according to film thickness in order to ensure sufficient crosslinking of the resist film. A two-step PEB is recommended to reduce film stress which can lead to cracking and/or adhesion loss.

See Process Guide Table for details.

Develop

HARE-SQ is designed for use with KemLab SQ developer. It can be developed using immersion, puddle or spray puddle. Thicker films benefit from refreshing developer during the develop step; such as with a double puddle.

Rinse developer off substrate with isopropyl alcohol (IPA) & dry.

See Process Guide Table for details.

Hardbake

HARE-SQ can be hardbaked for permanent applications that would benefit from further crosslinking.

Bake at > 120^{o}C for at least 5 minutes (hot plate). A short hardbake can fuse cracks caused by film stress.

For permanent structures, temperatures above 150^{o}C are recommended. Oven bake will increase crosslinking with minimal increase in stress.

Handling & Disposal Considerations

Consult the MSDS for handling and appropriate. HARE-SQ contains a combustible liquid; keep away from ignition sources, heat, sparks and flames.

HARE-SQ is compatible with typical waste streams used with photoresist processing. It is the user's responsibility to dispose in accordance with all local, state, and federal regulations.