TECHNICAL INFORMATION

Futurrex
Productivity Tools

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NEGATIVE RESIST NR5-8000

Description

- Negative Resist NR5-8000 is a negative tone photoresist designed for thick film applications and is compatible with UV exposure tools emitting at the 365 nm wavelength, including wafer steppers, scanning projection aligners, proximity printers and contact printers.
- These are the advantages of NR5-8000 over other resists:
  - superior resolution capability
  - high photospeed which translates into high exposure throughput
  - fast development time
  - superior temperature resistance of up to 180°C
  - superior selectivity in RIE processes
  - easy resist removal using Resist Remover RR4
  - shelf life exceeding 3 years at room temperature storage.
- The formulation and processing of NR5-8000 were designed with regard to occupational and environmental safety. The principal solvent in NR5-8000 is cyclohexanone and development of NR5-8000 is accomplished in a basic water solution.

Properties

♦ Solids content (%)	39-43
♦ Principal solvent	cyclohexanone
♦ Appearance	light yellow liquid
♦ Coating characteristic	very uniform, striation free

♦ Film thickness:

Coating Spin Speed (rpm)	Time (s)	Oven Bake Time (min) 80°C	Hotplate Bake Time (s) 150°C	Post-Exposure Hotplate Bake Time (s) 100°C	Film Thickness (nm)
250	30	15 followed by 180		240	90000-95000
400	30	15 followed by 120		120	54000-60000
1000	40	0	60	60	12500-14500
2000	40	0	60	60	9000-12000
3000	40	0	60	60	7500-8500
4000	40	0	60	60	6250-6750
5000	40	0	60	60	5750-6250

♦ Sensitivity at 365 nm exposure wavelength (mJ/cm² for 1 µm thick film)	21
♦ Guaranteed shelf life at 25°C storage (years)	3

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Processing

1. Application of resist by spin coating at a selected spin speed for a time designated in a film thickness vs. spin speed table on page 1.
2. Softbake procedure is determined by film thickness. Please refer to bake instructions on page 1.
3. Resist exposure in a tool emitting 365 nm wavelength. Please determine 365 nm exposure light intensity (mW/cm²) with a proper gauge. Multiply resist thickness (µm) by 21 mJ/cm² to obtain exposure dose. Divide exposure dose (mJ/cm²) by light intensity (mW/cm²) at 365 nm wavelength to obtain exposure time (s).
4. 100°C hotplate bake for a time depending on a film thickness. Please refer to bake instructions on page 1.
5. Resist development in Resist Developer RD6 by spray or immersion at 20-25 °C. Development time for an 8 µm thick film is 40 s and for 100 µm thick film is 330 s.
6. Resist rinse in deionized water until water resistivity reaches prescribed limit.
7. Drying of resist.
8. Removal of resist in Resist Remover RR4 or in acetone.

The above procedure refers to substrates, which are good conductors of heat such as silicon, GaAs etc. Bake times need to be increased by a factor of 3.5 for substrates that are poor conductors of heat such as glass.

Process Results

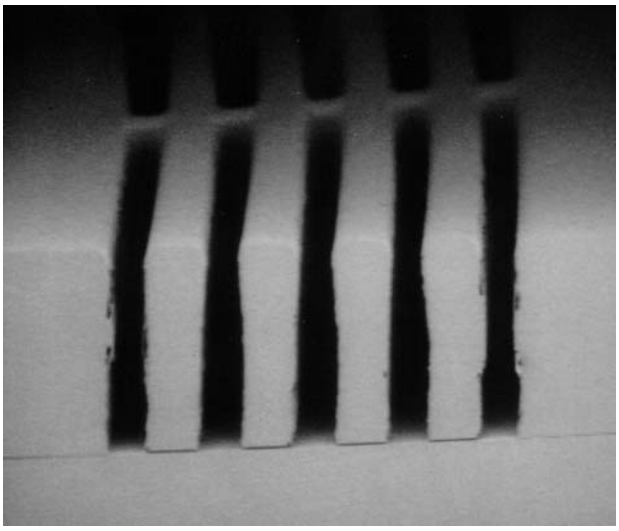

Figure 1. Example of resist resolution.
Film thickness: 54 µm, mask dimension: 9 µm line/space
exposure dose: 1100 mJ/cm², focus offset: -15 µm.
Exposure tool: Ultratech Stepper Saturn Model, i-line

Handling Precautions

Negative Resist NR5-8000 is a flammable liquid. Handle it with care. Keep it away from heat, sparks and flames. Use adequate ventilation. It may be harmful if swallowed or touched. Avoid contact with liquid, vapor or spray mist. Wear chemical goggles, rubber gloves and protective coating.