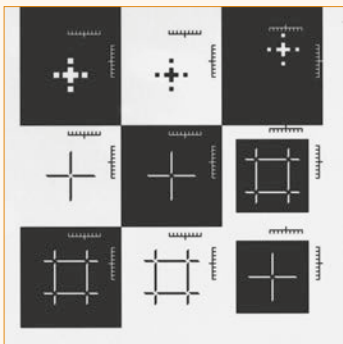
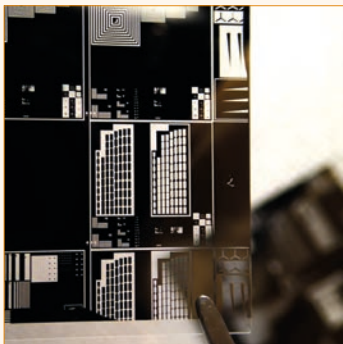
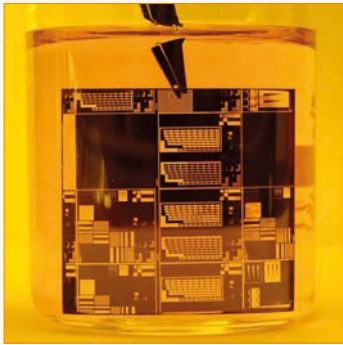
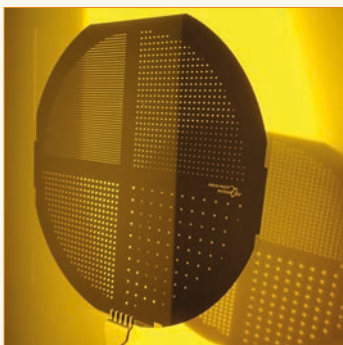


Chrome Etch 18

A ready-to-use etchant for chromium thin films and other metals



Etching of a test pattern using positive tone ma-P 1215 photoresist as etch mask.



Etched apertures in a chromium thin film using negative tone ma-N 1410 photoresist as etch mask.

Applications

Chrome Etch 18 is designed for use in microlithographic applications where high reproducibility and tight dimensional control are required. The ready-to-use solution, which is based on acidic cerium-(IV) salt, is compatible with standard positive and negative tone resist systems. The principle application is in thin-film technology like micro optics, optical gratings and thin film circuitry. It is also commonly used in mask manufacturing for etching bright or anti-reflective chromium thin-films on mask-blanks. Besides etching chromium, it can also be used to etch chrome-nickel alloys, silver, copper, molybdenum and tungsten films.

Chrome Etch 18 is a safe and easy to handle etchant, requiring standard safety precautions. Custom solutions are available upon request.

Physical & Chemical Properties

Appearance	clear, orange liquid
Density (20°C)	1.15 g/cm ³
Filtration	0.45 µ (for tighter specifications, please contact mrt)
Ce (IV)-content	43 g/L
Total acidity	2 mol/L
Acids	nitric acid, perchloric acid

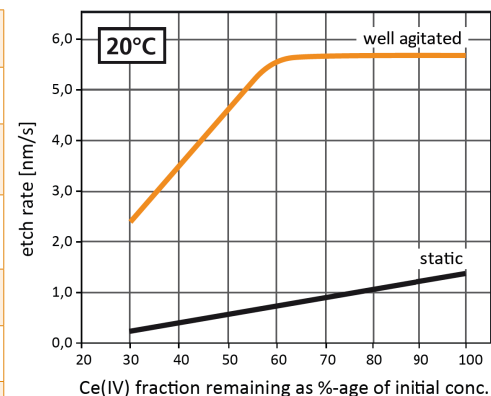
General Process Information

The initial etch rate strongly depends on the mode of agitation: if the specimen is properly agitated or the solution well mixed, an etch rate of about **300 - 420 nm/min** can be obtained at **20°C**.

Without agitation or fluid convection, the rate is on the order of **60 nm/min**.

During the dissolution of chromium, Ce(IV)-ions are converted to Ce(III) and therefore the etch rate drops with the number of substrates processed. This results in a gradual decrease of the rate as shown in the figure below.

Mode of use	immersion or spray
Temperature range	20 – 40°C (typically)
Cr etch rate at 20°C	5 – 7 nm/s agitated 1 – 2 nm/s static
Etch capacity per Liter (theoret. maximum)	5.3 g Cr or 7.5 m ² @ 100 nm FT
High etch rates with	Cr, Cu, Ag, V
Moderate etch rates	Al, Mo, W, Ni
Inert metals	Au, Pd, Pt
Compatible resists	positive and negative tone
Compatible materials	plastic, glass
Container size	bottles: 1L, 2.5L barrel: 30L



Approximate etch rate in nm/s vs. fraction of Ce(IV) left, for strictly static or well agitated conditions at a temperature of 20°C. The data corresponds to etching a 250 nm chromium film on glass. The reaction is strongly limited by diffusion/mass transfer to and from the surface which is why agitation speeds up the reaction significantly.