ARC®29A

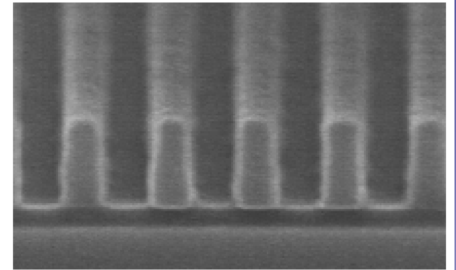
193nm Anti-Reflective Coating

ARC29A anti-reflective coating is specifically formulated to address emerging 193nm photolithography applications. This product is designed to perform with a broad range of ArF photoresists. It is an acrylic-based BARC utilizing an attached chromophore to give excellent optical properties and improved etch performance.

ARC29A Features

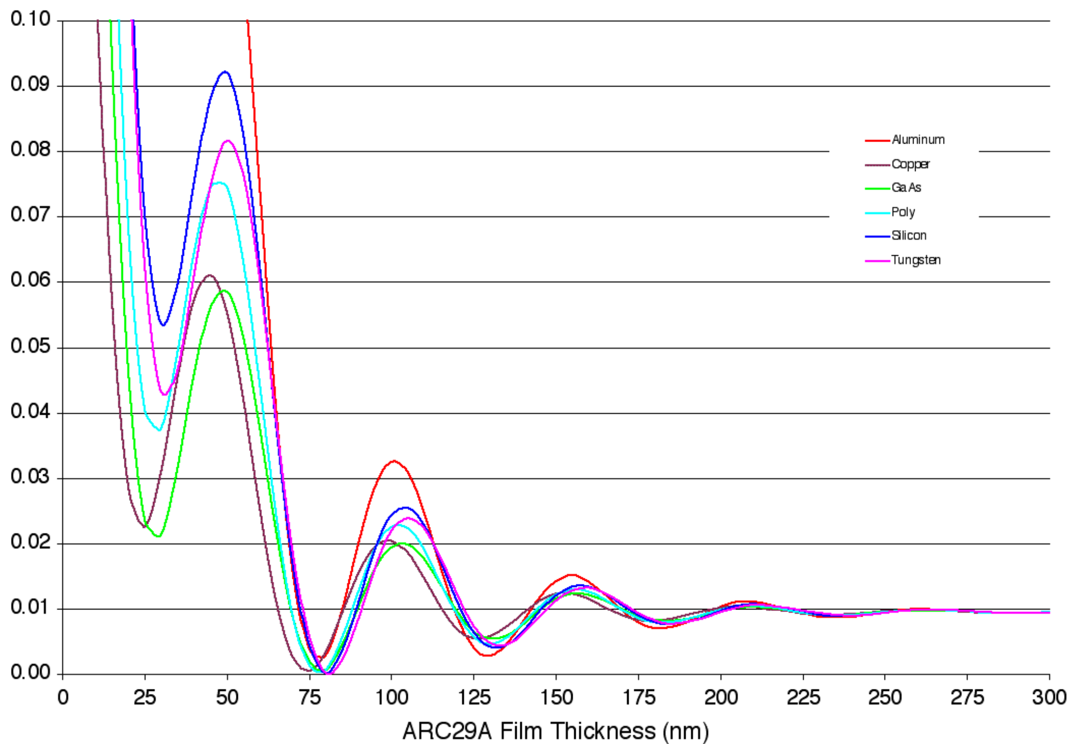
- Thermal Crosslinking System – minimizes BARC/resist intermixing
- Optimized optical properties – maximizes CD control
- Etch selectivity up to 1.3:1 in CF4 gas recipe
- 0% swing ratio at 2nd minimum
- ARC29A-308 designed for 300mm wafer.

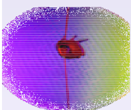
Feature size: 0.10μm



Resist: JSR® AR412JK
100nm dense line
(1:1.1)

ARC29A Reflectivity Curve





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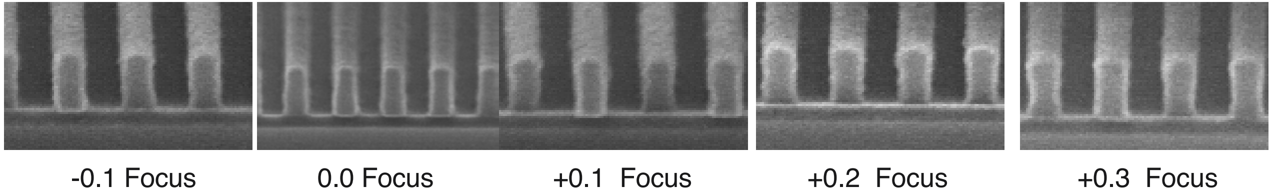
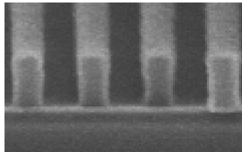
Where Innovation Takes Flight

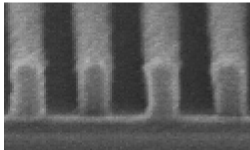
- ## ARC29A Photoresist Compatibility



-0.1 Focus | 0.0 Focus | +0.1 Focus | +0.2 Focus | +0.3 Focus



-0.2 Focus



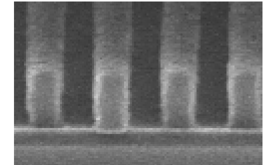
-0.3 Focus

Expanded view 0.0 Focus

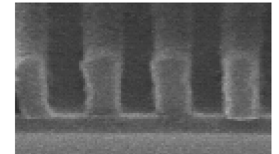
Processing Conditions

Resist: ARCH GAR8105G1
Thickness: 300nm
PAB: 115°C/90 sec
PEB: 115°C/90 sec.
Illumination: NA = 0.63
ø= 0.87/0.57, 2/3
Exposure Dose: 15 +1mJ/cm2
Development = OPD5262/60sec.
BARC Bake: 205°C/60 sec.
ARC 29A Thickness = 770Å

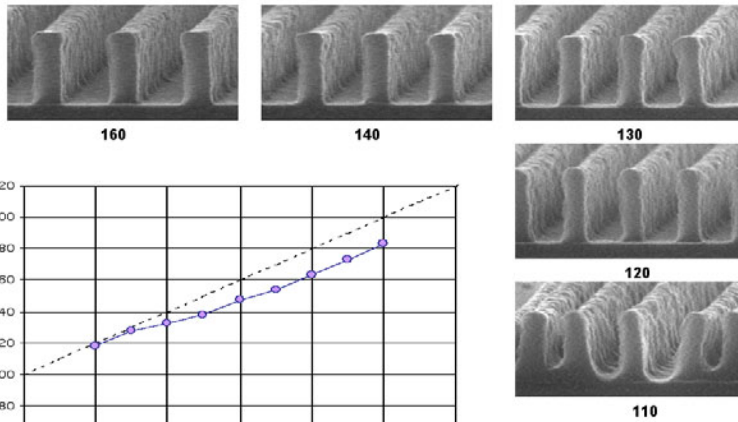
Target Pattern: 100nm L/S

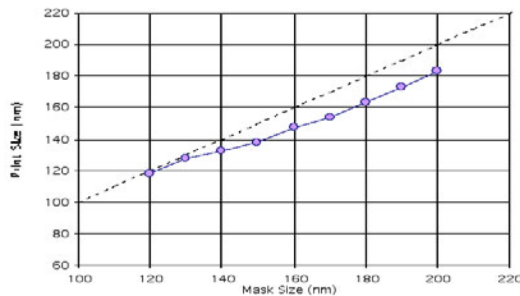


+0.4 Focus



+0.5 Focus





Data courtesy of TOK

Processing Conditions

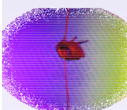
Resist: TOK® TArF-P6071
Thickness: 340nm
PAB: 120°C/90 sec
PEB: 120°C/90 sec.
Illumination: Annular
NA = 0.60, 2/3
Exposure Dose: 16.4 mJ
Development = NMD-3, 60sec.
BARC Bake: 205°C/60 sec.
ARC 29A Thickness = 786Å

Target Pattern: 120nm L/S

- ## ARC29A Properties

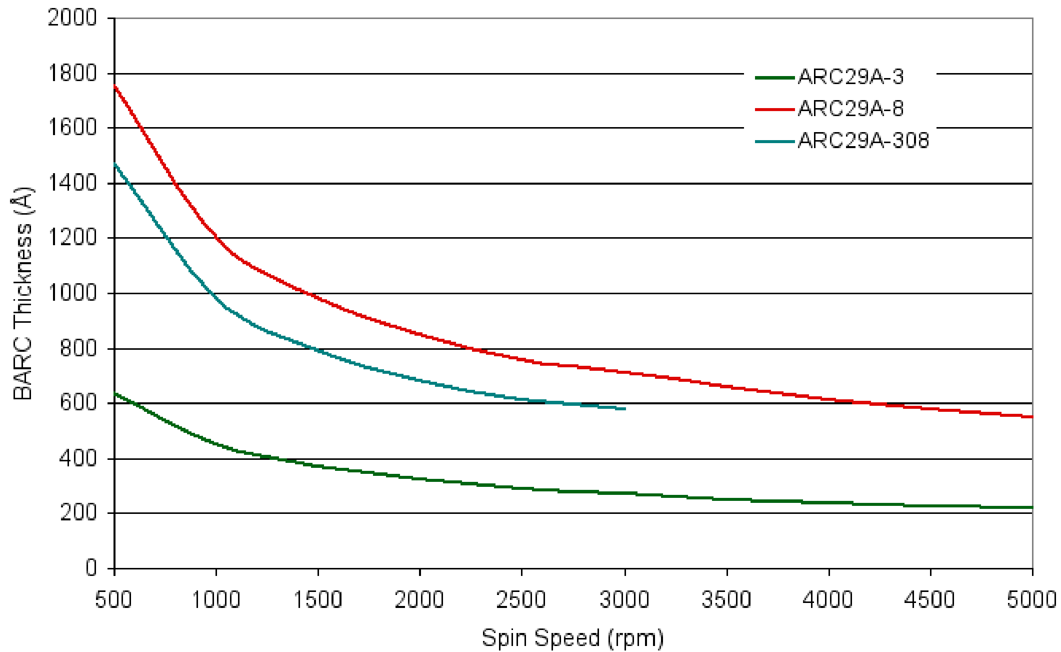
Optimal Thickness	~300Å
ARC29A-3 @ 2500rpm	~800Å
ARC29A-8 @ 2500rpm	~800Å
ARC29A-308 @1500rpm	In test
Shelf Life @ 21°C	>100°F (>38°C)
Flashpoint	

n @ 193nm	1.82
k @ 193nm	0.34
Cauchy A	1.54
Cauchy B	7.0E-3
Cauchy C	0
Ions: Al, Ca, Cu, Na	<20 ppb
Ions: Fe, K	<30 ppb
Ions: Mg, Mn	<10 ppb



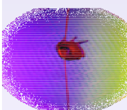
Where Innovation Takes Flight

▪ ARC29A Spin Speed Curve



▪ ARC29A Processing Conditions

- Coat: ARC29A is applied by a spin coat process. Apply with dynamic dispense at 700 rpm and immediately (no spread spin) ramp to final 2500 rpm spin for 30 seconds.
- Bake:Single stage hotplate bake at 180°C to 220°C for 60 to 90 seconds. Bake may require temperature optimization to achieve the desired photoresist profile. For some processes, optimization of the coat and bake may be required to achieve optimum results.
- Resist Coat: Resist can be applied over ARC29A without any modification to the standard resist spin or bake process. Adhesion promoter is not required.
- Exposure: In most applications, exposure dose may need to be increased from that of stand-alone resist process by 20 - 50% due to the reduction in reflected light from the substrate.
- Resist Develop: Use standard photoresist develop parameters.
- Dry Etch: ARC29A may be dry etched by a number of plasma etch methods in a range of etch gases including: O_2, $O_2/CHF_3/Ar$, C_2F_6, Cl_2, N_2/O_2, O_2/HBr and HCl.



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