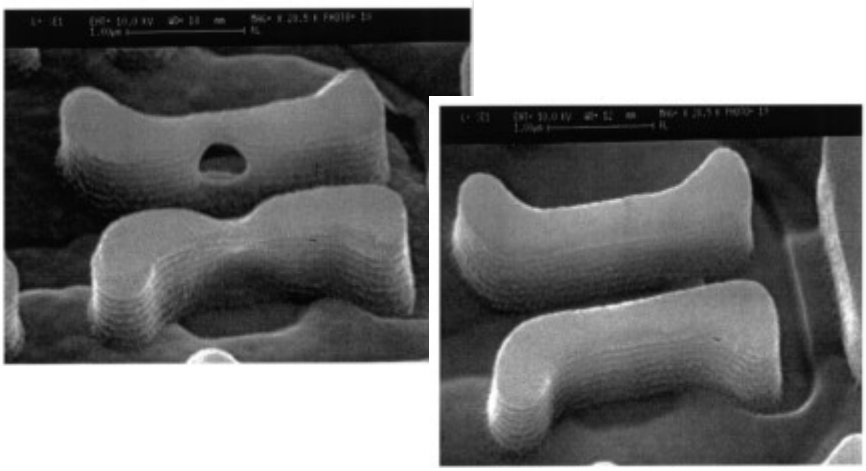
(grey /black/red bar; „Product Data Sheet“)



AZ® BARLi® -II

Bottom Antireflective Coating

Resist structure without and with bottom antireflective coating (*)

AZ® BARLi® -II is a bottom antireflective layer coating for use on highly reflective surfaces in the semiconductor industry. It is designed to work with positive photoresists and is optimized for i-line exposure tools. Upon completion of the lithographic process, AZ® BARLi® -II is patterned in a dry-etch process.

AZ® BARLi® -II coating material is formulated in photoresist-compatible solvents to simplify the EBR process and to be both environmental and user friendly. We recommend AZ® EBR 70/30 for best performance.

AZ® BARLi® -II is tailor-made to yield the near-optimum values for refractive indices (n and k) for i-line lithography, which ensures minimum reflectivity and maximum swing reduction for photoresist layers.

Composed of highly absorptive polymer-bound dyes, this material provides excellent coating uniformity and step coverage.

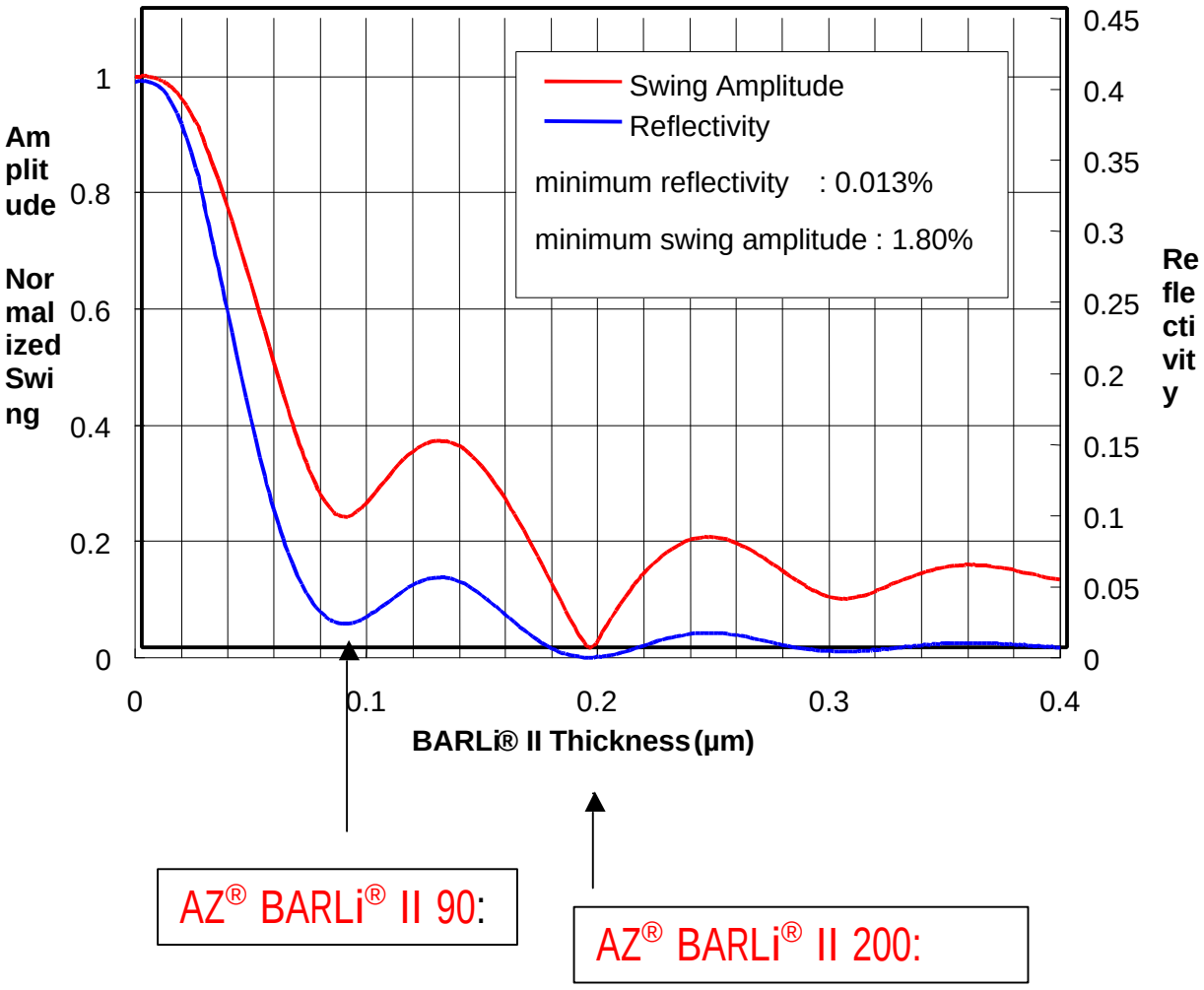
AZ® BARLi® -II shows high etch selectivity (comparable to AZ® BARLi®) and high thermal stability up to 230°C. It does not show intermixing with photoresist

AZ® BARLi® -II is available in two thickness grades, 900 A and 2000 A, in order to provide optimum film thickness for the first and the second swing minimum respectively at about 3000 rpm spin speed.

Clariant Logo

Reflectivity Reduction vs. AZ® BARLi®-II Film

Film Stack : Resist (n=1.704-0.024i) on
(at 365nm) AZ® BARLi® II (n=1.63-0.31i) on
Si (n=6.55-2.07i)



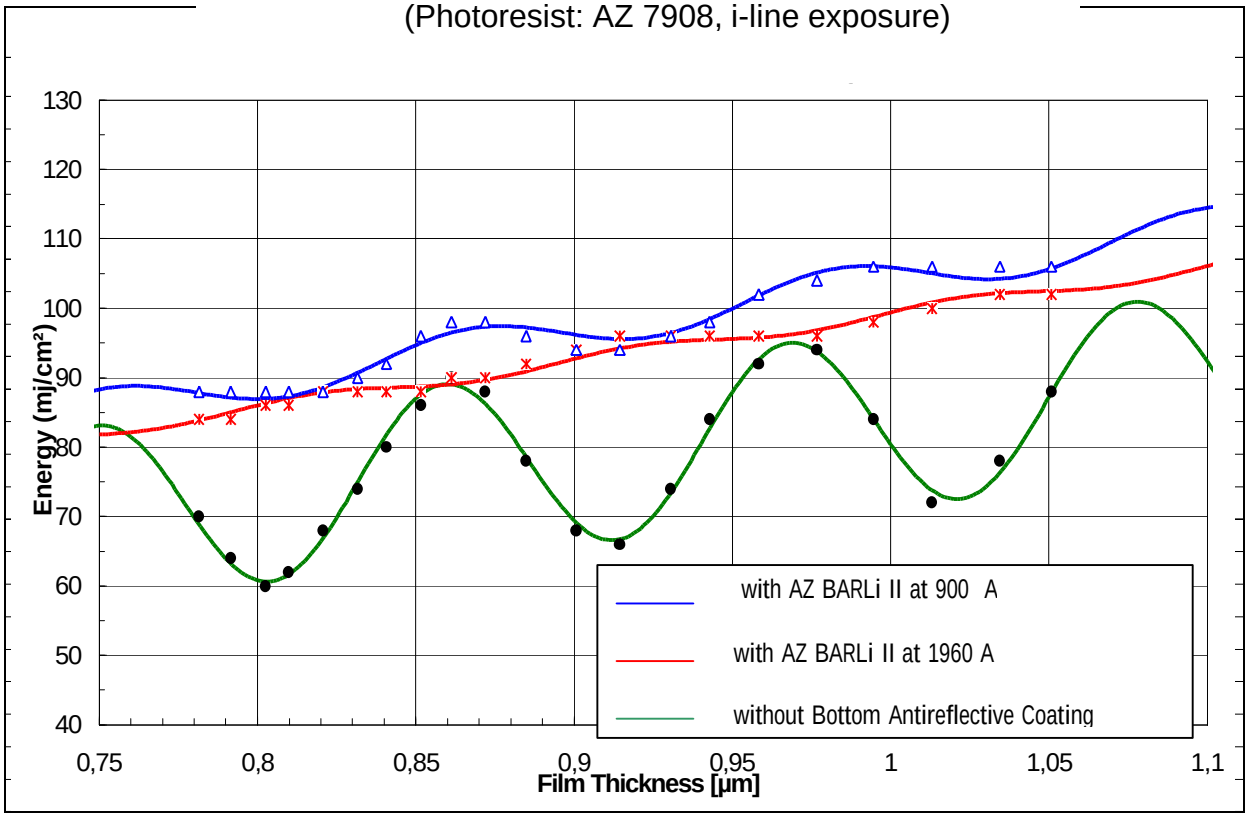
Two grades to meet individual customer requirements:

AZ® BARLi® II 200:
Approx. 200 nm Film Thickness for maximum suppresion of reflectivity, additional planarisation and low sensitivity to Film Thickness variation

AZ® BARLi® II 90:
Approx. 90 nm Film Thickness to facilitate dry etching

Swing Curve with AZ® BARLi-II

(Photoresist: AZ 7908, i-line exposure)



Typical Process Cycle		
Pre-Treatment	no HMDS recommended	
Spin	Target Thickness:	910 A for AZ® BARLi® -II 90 1970 A for AZ® BARLi® -II 200
	Apply:	approx. 4 ml; static or dynamic at 500 –1000 rpm
	Spin:	approx. 3000 rpm
EBR	AZ® EBR 70/30 recommended; also compatible to many other EBR for positive photoresists	
Bake	Hotplate, 180°C to 220°C (200°C recommended), 60 seconds	
Apply, expose, develop	i-line Photoresist	
Etch AZ® BARLi®-II	Dry-etch with $CHF_3/C_2F_6/0_2$ or HBr/O_2 etc.	

Film Thickness	2000 rpm	2500 rpm	3000 rpm	3500 rpm
AZ® BARLi® -II 90	1130 **Å**	1010 **Å**	930 **Å**	860 **Å**
AZ® BARLi® -II 200	2350 **Å**	2160 **Å**	2010 **Å**	1860 **Å**

Film Thickness Measurement

AZ® BARLi® –II film thickness can be measured with standard optical measurement equipment using following Cauchy coefficients:

$N_1 = 1.6097$ $N_2 = 0.0083014\ \mu m^2$ $N_3 = 0.006187\ \mu m^4$

where $N = N_1 + N_2/\lambda^2 + N_3/\lambda^4$ (λ in µm)

Solvent Safety

AZ® BARLi® -II isformulated with a mixture of ethyl lactate and PGME both of which are safer solvent products.

Equipment Compatibility

AZ® BARLi® -II is compatible with all commercial available wafer processing equipment. Recommended materials of construction include stainless steel, glass, ceramic, PTFE, polypropylene and high-density polyethylene.

Storage

Keep in sealed original containers away from oxidants, sparks and open flames. Must be kept refrigerated. The preferred temperature is between 0°C and 15°C. Empty containers may contain harmful residue and vapors.

Handling Precautions

Firts Aid

Refer to current Material Safety data Sheet (MSDS) for detailed information prior to handling.

(*) Front page SEMs courtesy of J. Johnson, ST Microelectronics, Phoenix AZ

(Clariant BU EM WW adresses)