

ETCH RATE CHARACTERIZATION

All ER testing performed on pieces, about 1 cm on a side, with handle wafer only when necessary. Selectivity for LSN* and Si₃N₄* is measured for non-hard-baked S1827 resist, except where indicated. Selectivity for SiO₂ and Si is measured for hard-baked OiR 620-7i resist, except where indicated. Etching will be pattern- and sample-size-dependent.

Seasons are performed with the recipe gases on an empty chamber.

* "LSN" = low stress nitride grown in furnace. "Si₃N₄" = standard nitride grown in furnace. Selectivity = material ER / mask ER.

**Selectivity for these nitride etches were measured for hard-baked OiR 620-7i resist. Selectivity for all other LSN and Si₃N₄ etches were measured for non-hard-baked S1827 resist.

Date	Tool	Chemistry, or Recipe name	Material*	Rate(nm/min)	Selectivity*	Notes
02/16/11	Oxford 80 #1	CHF3/O2	SiO2	38.9	0.9	10 min O2 plasma clean before etch followed by 10 min season
01/17/11	Oxford 80 #1	CHF3/O2	LSN	79.2	1.4	"
02/03/11	Oxford 80 #1	CHF3/O2	Si ₃ N ₄	74.1	1.4 **	"
01/17/11	Oxford 80 #1	CF4	Si	69.6	0.6	"
02/23/11	Oxford 80 #1	CF4	SiO2	39.9	0.3	"
02/23/11	Oxford 80 #1	CF4	LSN	107.6	0.8	"
02/23/11	Oxford 80 #1	CF4	Si ₃ N ₄	98.9	0.8 **	"
03/02/11	Oxford 80 #1	SF6/O2	Si	679.3	6.0	"
02/16/11	Oxford 80 #1	CHF3/Ar	SiO2	50.2	2.4	"
02/16/11	Oxford 80 #1	CHF3/CF4/Ar	SiO2	56.8	1.1	10 min O2 plasma clean, 3 min season
02/11/11	Oxford 80 #2	CHF3/O2	SiO2	43.2	1.4	3 min O2 plasma clean , 10 min season
01/17/11	Oxford 80 #2	CHF3/O2	LSN	53.7	1.3 **	"
02/03/11	Oxford 80 #2	CHF3/O2	Si ₃ N ₄	58.4	2.0 **	"
01/17/11	Oxford 80 #2	CF4	Si	74.4	0.9	"
02/23/11	Oxford 80 #2	CF4	SiO2	39.7	0.5	"
02/23/11	Oxford 80 #2	CF4	LSN	135.2	1.7	"
02/23/11	Oxford 80 #2	CF4	Si ₃ N ₄	87.9	1.2 **	"
08/06/10	Oxford 80 #2	SF6/O2	Si	1811.5	7.6	"
02/16/11	Oxford 80 #2	CHF3/Ar	SiO2	14.7	9.5	10 min O2 plasma clean, 3 min season
02/16/11	Oxford 80 #2	CHF3/CF4/Ar	SiO2	37.4	1.7	3 min O2 plasma clean, 3 min season
02/10/11	Oxford 100	"Si CF4 Test"	Si	149.8	0.8	10 min O2 plasma clean , 3 min season with Si wafer
02/16/11	Oxford 100	"CHF3/O2 oxide etch"	SiO2	64.2	2.3	"
1/17/11	Oxford 100	"CHF3/O2 nitride etch"	LSN	59.7	1.4	"

Date	Tool	Chemistry, or Recipe name	Material*	Rate(nm/min)	Selectivity*	Notes
01/17/11	Oxford 100	"CHF3/CF4/O2- Si3N4 etch" (LSN etch)	LSN	32.7	1.3	"
01/17/11	Oxford 100	"CHF3/O2 nitride etch"	Si3N4	67.1	1.7	"
10/29/09	Un770	OTRENCH, 70 loops	Si	296 nm/loop	76	Very pattern dependent
03/02/11	PT770 Left	BCl3/Cl2 (CLNP6 recipe)	Si	207.6	Oxide:19.8	3 min season with Si wafer
03/02/11	PT720	BCl3/Cl2 (Si etch recipe)	Si	60.5	Oxide:18.7	10 min season with Si wafer
07/22/09	PT740	Cl2/O2 (kwame.bch etch recipe)	Cr, pure	13.7	1.2	Conditioning (see tool manual for time)
12/08/10	PT740	BCl3/Cl2 (Aletch.bch recipe)	Al, pure	77.7	1.5	Conditioning (see tool manual for time) + 10 min season with Al Target
02/16/11	Trion	Standard Cr etch	Cr, pure	52.2	2.1	Very pattern dependent
12/13/10	PT72	CF4	SiO2	27.6	0.4	5 min O2 plasma clean before etch +10 min season
12/13/10	PT72	CHF3/O2	SiO2	26.4	1.2	"
12/01/10	PT72	SF6/O2	Si	35.7	0.3	"
12/06/10	PT72	CF4	LSN	55.7	1.3 **	"
12/01/10	PT72	CF4	Si3N4	71.5	1.0 **	"
12/06/10	PT72	CHF3/O2	LSN	54.5	3.3 **	"
02/10/11	PT72	CHF3/O2	Si3N4	41.8	1.8 **	"
12/16/10	PT72	CF4	Si	50.1	0.7	10 min O2 plasma clean before etch + 10 min season

**Selectivity for these nitride etches were measured for hard-baked OiR 620-7i resist. Selectivity for all other LSN and Si3N4 etches were measured for non-hard-baked S1827 resist.