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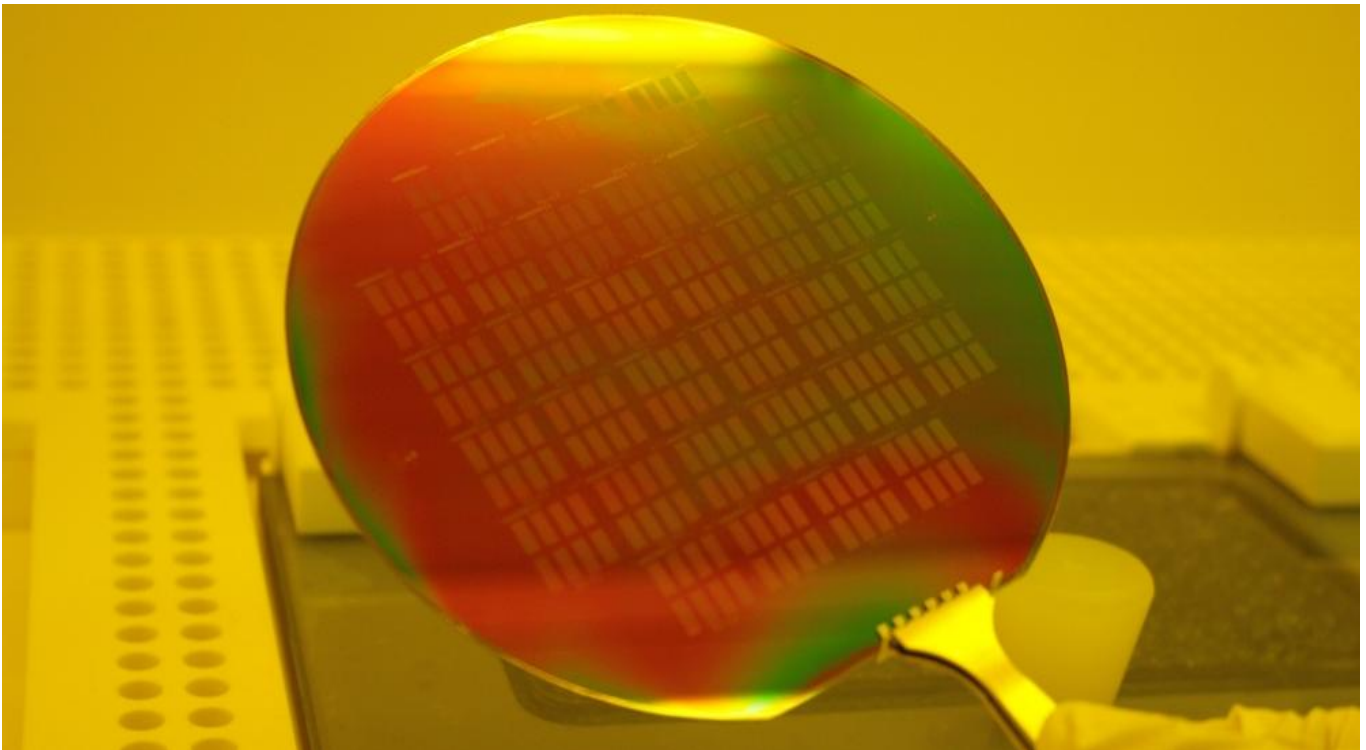
PLUS 4

Semiconductor, MEMS / NEMS Laboratory

Resists and Wafer & Substrates

Overview

February 2014



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PLUS FOUR RESISTS AND WAFER / SUBSTRATES

Complementary to our equipment supply and related services in the field of semiconductor, MEMS / NEMS production and R&D, we provide a variety of *photo resists* and *wafers / substrates*.

Photo Resists

In order to structure a wafer / substrate, one of the most established techniques is *photo- or UV Lithography*. The image / shadow of a photomask, with its chromic structures, is transferred to the wafer surface, coated with photosensitive material, using UV light for the exposure and a subsequent developing process. In general one has to differ between *positive* and *negative* photo resists. Using negative resist, the exposed areas will remain and the non-exposed areas will be diluted by the developer media. For a positive resist this is vice versa.

Lithography technologies - Overview

Pocess	**Resolution**
UV Lithography	>1 µm
Electron Beam Lithography	>10 nm
Nano Imprint Lithography	>30 nm

With regard to the required structure size and resolution, PLUS FOUR arranged standard photo resist packages, which are also available in small trading units.

Wafer / Substrates

In more than 90% of all semiconductor and MEMS/NEMS applications and processes, silicon or glass wafers / substrates are used. With regard to the application, the most common or most suitable wafers / substrates are listed in the below table:

Wafer	**Specification**
Silicon wafer	4 inch, <100>, OSP, 525 µm ± 25 µm, 1-20 ohm cm
Silicon wafer	6 inch, <100>, OSP, 675 µm ± 35 µm, 1-30 ohm cm
Borofloat wafer	4 inch, 500 µm ± 20 µm
Borofloat wafer	6 inch, 700 µm ± 50 µm

Borofloat 33 (similar to Pyrex) is produced within a Float-Process. It is possible to reach thin (0.2 mm) and very large (up to 2500mm x 2000mm) substrate plates. The number 33 signs the thermal extension coefficient ($32.5*10^{-7}$ 1/K), which is the same extension coefficient as pure silicon. This makes anodic bonding possible and also eutectic bonding, fusion bonding, adhesive bonding.

Properties of silicon and glass as compared to polymer – Overview

Material Properties	**Glass**	**Polymer**	**Silicon**
Optical properties	+++	+	IR
Chemical Inertness	+++	-	++
Surface properties	++	+/-	++
Thermal stability	+++	+	+++
Biocompatibility	++	++	++
Hydrophility	+++	-	+
Porosity (absorption)	+++	-	+++
Shelf life	+	-	++
Reproducibility	++	+/-	+++

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PLUS FOUR provides several Silicon-Wafers and SOI / DSOI Wafers with defined properties: Size, Quality, Roughness, TTV (Total-Thickness-Variation), Doping, Crystal Orientation. Our yearlong experience is Your benefit.

All offered wafers / substrates are also available with added Coating:

	Material	**Application**
Metals	Ag, Al, Au, Cr, Ni, Ti, TiW, Pt, Si, Ni, Pb	Electrodes, conductive layer, bond pads, seed layer
Insulator	$SiO2$, $SixNy$, ONO	Membranes, hard mask, intermediate layer, optical layer
Compound Semiconductors	epitaxial layers	

Pricing depends on wafer size, number of wafer, material and film thickness. Please contact us for your individual package.

You want to start with process development or you are running an education laboratory?

PLUS FOUR provides standard R&D packages and is also able to offer small trading units.

You need quick and defined delivery times, please benefit from 43 years of experience in export business.

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Set of wafer and substrates relevant for customer process (34.176)

Item	Qty	Specification	Cat. No.
001	75	Silicon wafer 4 inch	PF Si-100-525
002	25	Glass wafer for anodic bonding 4 inch	PF BF-100-500
003	75	Silicon wafer 6 inch	PF Si-150-675
004	25	Glass wafer for anodic bonding 6 inch	PF BF-150-700
005	75	Silicon wafer 8 inch	PF Si-200-725
006	25	Glass wafer for anodic bonding 8 inch	PF Si-200-1100

Photoresist for wafer/substrate processing BASIC UV lithography (34.181)

Item	Qty	Specification	Cat. No.
5	3 l	positive UV Resist	PF-UV-pC-GA10.1
6	50 l	Developer	PF-UV-pD-GA.1
11	25 l	Polymer remover	PF-UV-aRR
18	3 l	adhesion promoter	PF-UV-aRAP

Photoresist for wafer/substrate processing ADVANCED UV lithography (34.181)

Item	Qty	Specification	Cat. No.
5	3 l	positive UV Resist	PF-UV-pC-GA10.1
6	50 l	Developer	PF-UV-pD-GA.1
7	1 Gallon	positive UV Resist	PF-UV-pC-BF12
8	1 Gallon	positive UV Resist	PF-UV-pC-BF20
9	1 Gallon	positive UV Resist	PF-UV-pC-BF40
10	50 l	Developer	PF-UV-pD-BF
11	25 l	Polymer remover	PF-UV-aRR
12	2,5 l	negative UV Resist	PF-UV-nC-GM10.1
13	2,5 l	negative UV resist, Lift-off	PF-UV-nC-GM20.1
14	50 l	Developer	PF-UV-nD-GM.1
15	1 l	solvent to dilute negative resist	PF-UV-nCSo-GM.1
18	3 l	adhesion promoter	PF-UV-aRAP

Photoresist for wafer/substrate processing SUPERIOR UV lithography (34.181)

Item	Qty	Specification	Cat. No.
1	2,5 l	positive UV Resist	PF-UV-pC-GM10.1
32	2,5 l	positive UV Resist	PF-UV-pC-GM20.1
2	50 l	Developer	PF-UV-pD-GM.1
4	25 l	Resist remover	PF-UV-pPR-GM.1
5	3 l	positive UV Resist	PF-UV-pC-GA10.1
6	50 l	Developer	PF-UV-pD-GA.1
7	1 Gallon	positive UV Resist	PF-UV-pC-BF12
8	2 Gallon	positive UV Resist	PF-UV-pC-BF20

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9	3 Gallon	positive UV Resist	PF-UV-pC-BF40
10	50 l	Developer	PF-UV-pD-BF
11	25 l	Polymer remover	PF-UV-aRR
12	2,5 l	negative UV Resist	PF-UV-nC-GM10.1
13	2,5 l	negative UV resist, Lift-off	PF-UV-nC-GM20.1
14	50 l	Developer	PF-UV-nD-GM.1
15	1 l	solvent to dilute negative resist	PF-UV-nCSo-GM.1
16	1 l	negative resist	PF-UV-nthC-AM500.1
17	50 l	Developer	PF-UV-nD-AM.1
18	3 l	adhesion promoter	PF-UV-aRAP

Photoresist for wafer/substrate processing within UV nano imprint lithography (34.181)

Item	Qty	Specification	Cat. No.
19	1 l	NIL resist	PF-NIL-CUV2
20	1 l	Adhesion promoter	PF-NIL-UV2AP
21	0,5 l	Solvent to dilute the NIL resist	PF-NIL-UV2S
22	0,5 kg	Stamp material	PF-NIL-CUVst
23	0,5 kg	NIL resist	PF-NIL-CUVco
24	1 l	Antisticking	PF-NIL-CUVAS

Photoresist for wafer/substrate processing within electro beam lithography (34.181)

Item	Qty	Specification	Cat. No.
25	1 l	negative resist for E-beam	PF-EBL-nC40.3
26	20 l	metall-ion free developer	PF-EBL-nCDv40
27	1 l	Thinner for negative resist	PF-EBL-nCSo40
28	1 l	positive resist for E-beam	PF-EBL-pC95.2
29	0,5 l	Double layer Resist	PF-EBL-pC85.6
30	2,5 l	Developer for positive E-beam resist	PF-EBL-pCDv95

PLUS FOUR DISCLAIMER OF WARRANTY

All information given in this brochure have been added to the best of our knowledge. However, we cannot issue any guarantee concerning the accuracy of the information.
We assume no liability for any hazard for staff, equipment, the processed devices or any environmental damages which might stem from the information given in this brochure. In order to minimize any risk to man or equipment, it is in the responsibility of every person working in the laboratory or production environment to inform herself / himself about the processes to be performed in the appropriate (technical) literature.