

Semiconductor, MEMS / NEMS Laboratory

Chemicals and Gases

Overview

February 2014



PLUS FOUR CHEMICALS AND GASES

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

Chemicals

For the process of semiconductor devices, as well as MEMS / NEMS, the usage of diverse media, like wet chemicals and gases is necessary. Wet chemicals are used for the classical processes executed in wet benches, i.e. wet etching of Si, SiO₂, SiN and metals, lift-off processes as well as galvanization / electroplating. To meet the demands of processing micro or nano structures, these chemicals have to fulfill highest quality standards, such as VLSI (Very – Large – Scale – Integration)

- VLSI = Impurity metal ion concentration (per element) approx. 10-50 ppb, particle concentration < 250/ml.

Classical *solvents* and their scope of application:

Solvent	Feature	Application
Acetone	Media with extended fire hazard. High vapor pressure Low boiling point It becomes touch dry very quickly, often in combination with resorption of the impurities onto the substrate. Therefore a subsequent cleaning step is recommended, e.g. Isopropanol	suited for removal of oily or greasy contamination and impurities not recommended for lift-off because additional already lifted metal would resorb back on the substrate
Butyl acetate	High boiling point	suited for photo resist thinner
Ethanol	Low vapor pressure	suited for cleaning
Ethyl lactate	High boiling point	suited for photo resist thinner
Isopropanol, IPA	Low vapor pressure Low boiling point (a little higher as acetone)	suited for cleaning surfaces from organic impurities and, in a subsequent cleaning step after Acetone, rinsing contaminated Acetone off

Methanol	Toxic media Middle vapor pressure Low boiling point	suited to solve contaminated Acetone in a three-step cleaning process for substrate surfaces: 1. Acetone, 2. Methanol and 3. Isopropanol
NMP, N-Methyl-2-pyrrolidone	Low vapor pressure High boiling point Low resorption rate for solved particles	suited as lift-off medium and as stripper for photo resists
PGMEA	Low vapor pressure Suppression of particle formation in diluted resist	suited as solvent and thinner for photo resists and for edge bead removal (EBR) and as developer for SU-8

Also a solvent-free alternative for lift-off process is available. Please contact us.

Gasses

The purity of gases can be expressed as a percentage value or as a decimal fraction. The decimal fraction is an abbreviation of the percentage value, where the first digit represents the number of nines in the percentage value and the last digit represents the last digit of the percentage value.

- Oxygen 6.0 = purity 99.99990 volume percent
- Oxygen 5.8 = purity 99.9998 volume percent
- Oxygen 3.6 = purity 99.96 volume percent

At PLUS FOUR we care about quality and purity of chemicals and gases. We work together with process specialists and equipment suppliers to arrange standard packages optimized for defined processes.

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.

Chemicals for wafer and substrate processing within lithography (34.178)

Item	Qty	Specification	Cat. No.
001	25 L	Acetone VLSI	PF-acet-HQ
002	30 L	Acetone technical	PF-acet-LQ
003	25 L	IPA VLSI	PF-IPA-HQ
004	30 L	IPA technical	PF-IPA-LQ
005	10 L	Ethanol VLSI	PF-Etnol-HQ
006	30 L	Piranha: H2SO4	PF-wPCI-So-HQ
007	10 L	Pirahna: H2O2	PF-wPCI-HO-HQ

Chemicals for wafer and substrate processing within wet etching (34.178)

Item	Qty	Specification	Cat. No.
008	20 L	50% HF	PF-wGI-HQ-50
009	20 L	BOE	PF-wGI-B-HQ
010	5 kg	KOH	PF-wSi-p-HQ
012	30 L	H3PO4	PF-wN-I-HQ
013	7,6 L	Au etchant	PF-wM-Au-I-HQ
014	30 L	Cr etchant	PF-wM-Cr-I-HQ
019	20 L	Al etchant	PF-wM-Al-I-HQ

Chemicals for wafer/substrate advanced preparation and cleaning (34.178)

Item	Qty	Specification	Cat. No.
001	25 L	Acetone VLSI	PF-acet-HQ
002	30 L	Acetone technical	PF-acet-LQ
003	25 L	IPA VLSI	PF-IPA-HQ
004	30 L	IPA technical	PF-IPA-LQ
005	10 L	Ethanol VLSI	PF-Etnol-HQ
006	30 L	Piranha: H2SO4	PF-wPCI-So-HQ
007	10 L	Pirahna: H2O2	PF-wPCI-HO-HQ
015	10 L	SC1: NH4OH	PF-wS1CI-NH-HQ
016	10 L	SC1: H2O2	PF-wS1CI-HO-HQ
017	10 L	SC2: HCl	PF-wS2CI-HO-HQ
018	10 L	SC2: H2O2	PF-wS2CI-HC-HQ
020	25 l	Polymer remover high selectivity	PF-REM Pol-HS

Chemicals for wafer and substrate processing etching, cleaning, lift-off (34.178)

Item	Qty	Specification	Cat. No.
001	25 L	Acetone VLSI	PF-acet-HQ
002	30 L	Acetone technical	PF-acet-LQ
003	25 L	IPA VLSI	PF-IPA-HQ
004	30 L	IPA technical	PF-IPA-LQ
005	10 L	Ethanol VLSI	PF-Etnol-HQ
006	30 L	Piranha: H2SO4	PF-wPCI-So-HQ
007	10 L	Pirahna: H2O2	PF-wPCI-HO-HQ
008	20 L	50% HF	PF-wGI-HQ-50
009	20 L	BOE	PF-wGI-B-HQ
010	5 kg	KOH	PF-wSi-p-HQ
011	10 L	TMAH	PF-wSi-IAPH-HQ
012	30 L	H3PO4	PF-wN-I-HQ
013	7,6 L	Au etchant	PF-wM-Au-I-HQ
014	30 L	Cr etchant	PF-wM-Cr-I-HQ
015	10 L	SC1: NH4OH	PF-wS1CI-NH-HQ
016	10 L	SC1: H2O2	PF-wS1CI-HO-HQ
017	10 L	SC2: HCl	PF-wS2CI-HO-HQ
018	10 L	SC2: H2O2	PF-wS2CI-HC-HQ
019	20 L	Al etchant	PF-wM-AI-I-HQ
020	25 l	Polymer remover high selectivity	PF-REM Pol-HS

Chemicals-Gases package PECVD (34.179)

Item	Qty	Specification	Cat. No.
1	1	2% Silan - balance N2	PF-gSi.2-gN2.98
2	1	Ammoniak / Ammonica- CAO - F	PF-gNH3.100
3	1	Nitrogen	PF-gN2.100
4	1	Nitrogen	PF-gN2.100
5	1	Tetrafluoromethane	PF-gCF4.100
6	1	Nitrous Oxide	PF-gN2O.100

Chemicals-Gases package DRIE Si Etching (34.179)

Item	Qty	Specification	Cat. No.
3	1	Nitrogen	PF-gN2.100
7	1	Sulfurhexafluoride	PF-gSF6.100
8	1	Octafluorocyclobutane	PF-gC4F8.100
9	1	Helium	PF-gHe.100
10	1	Argon	PF-gAr.100
11	1	Oxygen	PF-gO2.100
12	1	Trifluormethane	PF-gCHF3.100

Chemicals-Gases package DRIE SiO₂+Si Etching (34.179)

Item	Qty	Specification	Cat. No.
3	1	Nitrogen	PF-gN2.100
7	1	Sulfurhexafluoride	PF-gSF6.100
8	1	Octafluorocyclobutane	PF-gC4F8.100
9	1	Helium	PF-gHe.100
10	1	Argon	PF-gAr.100
11	1	Oxygen	PF-O22.100
12	1	Trifluormethane	PF-gCHF32.100
13	1	Methane	PF-gCH4.100

Chemicals-Gases package Sputter (34.179)

Item	Qty	Specification	Cat. No.
3	1	Nitrogen	PF-gN2.100
10	1	Argon	PF-gAr.100
11	1	Oxygen	PF-gO2.100

Chemicals-Gases package Mask Aligner (34.179)

Item	Qty	Specification	Cat. No.
3	1	Nitrogen (N ₂)	PF-gN2.100
11	1	Oxygen (O ₂)	PF-gO2.100

Chemicals-Gases package Coater (34.179)

Item	Qty	Specification	Cat. No.
3	1	Nitrogen (N ₂)	PF-gN2.100

Chemicals-Gases package Bonder (34.179)

Item	Qty	Specification	Cat. No.
3	1	Nitrogen (N ₂)	PF-gN2.100

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 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.