Equipment & price list, Hands-on-access fab., Micro System Integration Center, Tohoku University

Facility (CR, office) usage fee per person : Tohoku Univ internal user : 830 JPY/h, Others : 980 JPY/h

Technical assistant fee : 6,514 JPY/h (Nanotechnology Platform User : 3,300 JPY/h)

As of October, 2019

	No.	Equipment name	Manufacture/type	Fee (JPY/h)	Wafer size	Note
Cleaning, drying	A-01	Draft chamber	As one PSH1200	1,076	Max 6"	Cleaning by acids, wet etching (Si, SiO2, metal, etc.)
	A-02	Draft chamber for SiN etching		1,406	Max 6"	SiN wet etching
	A-04	Inert oven for sintering	Yamato DN63H	1,136	Max 6"	Al sintering in N2
	A-05	Vacuum oven	Yamato DP-31	876	Max 6"	Annealing in vacuum
	A-06	Brush scrubber	Zenkyo	4,320	Max 6"	Wafer cleaning after polishing
	A-07	Spin dryer	Toho Kasei ZAA-4	1,976	Max 6"	
	A-08	Draft Chamber for organic		1,076	Max 6"	
	A-09	4" Spin dryer	SEMITOOL PSC101	1,696	4"	cassette type
	A-10	6" Spin dryer	SEMITOOL PSC101	1,696	6"	cassette type
	B-02	Spin coater	Mikasa 1H-DXII	1,860	Max 4"	
	B-03	Clean oven	Yamato DE62	2,468	Max 6"	Wafer bake
	B-04	Curing oven	Yamato DN43H	1,786	Max 6"	Polyimide curing in N2
	B-05	Double-side aligner	Suss MA6/BA6	2,870	Max 6"	Contact exposure, single/double side alignment, alignment for bonding
	B-08	Draft chamber for development		1,076	Max 6"	
	B-09	UV curing	Ushio UMA-802	3,108	4"	cassette type
	B-10	Spin coater	Actes ASC-4000	2,062	Max 6"	
	B-11	Spray developer	Actes ADE-3000S	1,868	Max 6"	Spray of developer and DI water
	B-13	Elionix EB lithography	Elionix ELS-F125	8,904	Max 6"	Max. 130keV, minimum resolution: 4nm
	B-14	Laser writer	Heidelberg Instruments DWL2000CE	6,950	Max 9"	405nm, min.L/S 0.7μm, photo mask making (Cr and emulsion), direct writing, gray scale lithography
	B-15	Maskless exposure system for ball	Toei Scientific Industrial	4,284	Ball	Maskless lithography on ball (diameter:1.0,3.3mm), resolution:1.5μm half pitch, alignment precision: 5μm
	B-16	Spin dryer	Toho Kasei ZAA-4	1,976	Max 6"	
	B-17	Hot plate	Shamal HHP-230SQ	946	Max 8"	40-400 degree, Accuracy: 1 degree
Oxidation, diffusion, ion implantation, annealing	C-01	Oxidation (semiconductor)	TEL XL-7	9,830	Max 6"	
	C-02	Oxidation (MEMS)	TEL XL-7	8,400	Max 6"	
	C-03	P diffusion	TEL XL-7	10,794	Max 6"	Pre-deposition
	C-04	P drive-in	TEL XL-7	9,088	Max 6"	
	C-05	B diffusion	TEL XL-7	10,172	Max 6"	Pre-deposition
	C-06	B drive-in	TEL XL-7	9,088	Max 6"	
	C-07	Annealing	TEL XL-7	9,346	Max 6"	Annealing after ion implantation
	C-08	Middle-current ion implanter	Nissin ion NH-20SR	19,310	4"	Max. 180keV, 0.6mA, P, B, cassette type
	C-09	High-current ion implanter	Sumitomo eaton nova NV-10	19,098	4"	Max. 80keV, 6mA
	C-10	Rapid thermal annealing	AG Associates AG4100	7,390	Max 6"	Max: 1100 degree, 100 degree/sec, cassette type
	C-11	Metal diffusion furnace	Koyo Model270	8,798	max 4"	Max: 1000 degree
CVD, sputtering, evaporation	D-01	LPCVD (SiN)	System service	10,052	Max 6"	SiN
	D-02	LPCVD (Poly-Si)	System service	10,102	Max 6"	Poly-Si
	D-03	LPCVD (SiO2)	System service	10,742	Max 6"	SiO2(NSG), SiON
	D-04	Thermal CVD	System service	20,196	Max 6"	Epipoly-Si, Poly-Si(non-doped, doped), Max. 1100 degree
	D-05	Sumitomo PECVD	Sumitomo MPX-CVD	14,624	Max 8"	SiN, SiO2, Max. 350 degree, low-stress SiN
	D-06	W-CVD	Applied Materials P-5000	9,136	4"	Tungsten CVD
	D-07	Anelva sputtering	Anelva SPF-730	7,298	Max 6"	4" x 9 wafers, 8" x 3 targets
	D-08	Shibaura sputtering	Shibaura CFS-4ESII	3,576	Max 8"	Wafer stage : 200mm, 3" x 3 targets
	D-09	EB evaporation	Anelva EVC-1501	6,628	4", 6"	
	D-10	Automatic sol-gel deposition	Technofine PZ-604	7,988	Max 4"	PZT deposition
	D-11	Electroplating	Yamamoto	2,482	Max 6"	Cu, Ni, Sn, Au
	D-12	MOCVD	Wacom	19,132	Max 8"	PZT deposition
	D-13	JPEL PECVD	JPEL VDS-5600	14,722	4"	SiN, SiO2
	D-14	Sumitomo TEOS PECVD	Sumitomo MPX-CVD	16,618	Max 8"	TEOS SiO2, SiN, Max. 350 degree, low-stress SiN
	D-15	Automatic Shibaura sputtering	Shibaura !-Miller CFS-4EP-LL	6,100	Max. 8"	Wafer stage : 220mm, 3" x 4 targets, Max. 300 degree, with LL chamber and automatic transfer system up to 10 wafer stages
	D-16	Sputtering for ball	Izumi-tech	4,060	Ball	Sputtering on ball (diameter:1.0,3.3mm), Au, Cr, Al, Pd, SiO2, etc. O2 plasma cleaning
	D-17	ALD	Technofine ALK-600	9,832	Max 6"	Al2O3 etc.
	D-18	High-temp. sputtering and O2 annealing	Youtec 21-0604	11,724	Max 8"	Max. 700 degree in Metal sputtering chamber (DC) and Oxides sputtering chamber (RF). High-pressure O2 annealing chamber
	D-19	Anelva multi-sputtering	Anelva SPC-350	5,638	4"	4" x 6 wafers, Max. 600 degree, 6" x 3 turgets (DC x 2, RF x 1, simultaneous), with LL chamber, ferromagnetic material possible

Category	ID	Equipment	Model	Fee	Size	Remarks
Etching	E-01	DeepRIE #1	Sumitomo MUC-21	8,054	Max 6"	Si deep RIE, mechanical cramp
	E-02	DeepRIE #2	Sumitomo MUC-21	8,054	Max 6"	Si deep RIE, mechanical cramp
	E-03	DeepRIE #3	STS	8,460	Max 6"	Si deep RIE, mechanical cramp
	E-04	Anelva RIE	Anelva DEA-506	6,732	Max 6"	SiN, SiO2, gas: CF4, CHF3
	E-05	Anelva Si RIE	Anelva L-507DL	6,130	Max 6"	Si, gas: SF6
	E-06	Al-RIE	Shibaura HIRRIE-100	10,484	Max 6"	Al, Si, gas: Cl2, BCl3, cassette type
	E-07	Ulvac asher	Ulvac UNA-2000	3,664	4"	2.45GHz, cassette type
	E-08	Branson Asher	Branson IPC4000	3,110	Max 6"	13.56MHz
	E-09	ECR etcher	Anelva ECR6001	14,534	Max 3"	gas: Cl2
	E-10	Ulvac RIE	Ulvac RIH-1515Z	9,836	Max 6"	Metals etc., gas: Cl2, BCl3, SF6, CF4, CHF3, Ar, N2, O2
	E-11	KOH etching		3,050	Max 6"	Si anisotropic etching
	E-12	TMAH etching		3,056	Max 6"	Si anisotropic etching
	E-13	DeepRIE #4	Sumitomo MUC-21	15,082	Max 8"	Si deep RIE, electrostatic cramp
	E-14	Ion milling	NS/Hakuto 20IBE-C	11,186	Max. 6"	Ar ion, 4" x 6, 6" x 3
	E-15	Vapor HF etching	Sumitomo Primaxx uEtch	8,322	Max 8"	SiO2 sacrificial etching
	E-16	Ulvac ICP-RIE#1	Ulvac NE-550	15,318	Max. 6"	SiO2, Metal etc., gas: CF4, CHF3, SF6, Ar, O2, N2, Cl2, BCl3
	E-17	Chemical Dry Etcher (CDE)	Shibaura CDE7	5,796	Max 4"	low-damage Si, SiN isotropic etching by radicals, removal of DRIE's scallops, gas: CF4, O2, N2
	E-18	Plasma cleaner	Yamato PDC210	3,148	Max. 6"	Ar, O2 plasma for wafer cleaning and resist ashing
	E-19	Ulvac ICP-RIE#2	Ulvac CE-300I	15,108	Max. 6"	SiO2, Metal etc., gas: CF4, CHF3, SF6, Ar, O2, N2, Cl2, BCl3
Bonding, polishing, packaging	F-01	Wafer bonder	Suss SB6e	5,088	Max 6"	Anodic bonding, metal bonding, polymer bonding
	F-02	Accretech dicer	Accretech	9,486	Max 6"	Cutting water: DI water
	F-03	Disco dicer	Disco DAD-522	2,442	Max 6"	Cutting water: Tap water
	F-04	Wire bonder	West Bond	1,142	Chip	Al, Au
	F-05	Laser marker	GSI WM-II	2,376	4"	Wafer marking
	F-06	6" wafer polisher	BN technology Bni62	2,070	Max 6"	Polishing and CMP for Si, SiO2, metal
	F-07	4" wafer polisher	BN technology Bni52	1,774	Max 4"	Polishing and CMP for Si, SiO2, metal
	F-08	Sand bluster	Shinto	3,158	Max 6"	Grass drilling
	F-09	EVG wafer bonder	EVG 520	5,238	8"	Thermal compression boding
	F-10	EVG aligner for wafer bonding	EVG Smart View Aligner	4,444	8"	IR alignment
	F-11	UV imprint	Toshiba machine ST-50	5,686	Max 4"	UV imprint, step & repeat available
	F-12	Thermal imprint	Origin Reprina-T50A	5,308	Max 2"	Max. 650 degree, Max. 30kN
	F-13	Excimer lamp cleaner	Dernaechste EXC-1201-DN	1,982	Max 4"	Organic contamination remover
	F-14	Surface planer	Disco DAS8920	12,570	4", 8"	Au or Cu bump precise planarization
	F-15	Water laser	Shibuya LAMICS AQL-1900	5,580	Max 12"	Si wafer, metal sheet, min. cutting width: 70μm
Measurement	G-01	Wafer dust counter	Topcon WM-3	1,700	Max 6"	
	G-02	Film thickness measurement	Nanometric NanoSpec3000	1,336	Max 6"	
	G-03	Dektak surface profiler	Dektak 8	1,614	Max 6"	
	G-04	Tenchor profiler	Tencor AlphaStep 500	1,614	Max 6"	
	G-05	Depth measurement	Union Hisomet	1,030	Max 6"	Optical non-contact measurement
	G-06	4-terminal prober		1,032	Max 6"	Wafer resistivity measurement
	G-07	Spreading resistance measurement	Solid State Measurements SSM150	2,572	Chip	Dopant profile measurement
	G-08	Wafer prober	Accretech EM-20A	2,616	4"	
	G-09	Microscope	Nikon L150	1,108	Max 6"	
	G-10	Digital microscope	Keyence/Kunoh	1,494	Max 8"	x20-200, x500-5000
	G-11	SEM	Hitachi S3700N	2,494	Max 12"	EDX, high/low vacuum, optical navigation
	G-12	FE-SEM	Hitachi S5000	4,222	Chip	High-resolution SEM
	G-13	Micro X-ray CT	Comscan techno ScanXmate D160TS110	3,040	Max 6"	Non-destructive
	G-14	Ellipsometer	Ulvac	928	Max 6"	Film thickness and refractive index
	G-15	Ultrasonic microscope	Insight IS-350	2,196	Max 12"	Non-destructive, void detection at bonding interface
	G-16	Digital thermal microscope	Apiste FSV-1200	1,202	Max 6"	Thermal imager, minimum resolution: 10μm
	G-17	Infrared microscope	Olympus/Hamamatsu	1,188	Max 6"	Double-side alignment check, void detection
	G-18	Quadrupole mass spectrometer	Canon anelva M-101QA-TDM	1,182		Residual gas monitoring
	G-19	TOF-SIMS	CAMECA TOF SIMS IV	15,104		
	G-20	Quick coater	Sanyu SC-701MkII	1,290	Max 2"	Pt coating before SEM
	G-22	Desktop Ellipsometer	Photonic lattice SE-101	702	Max 6"	High-speed and compact ellipsometer
	G-23	Large wafer size AFM	Digital Instruments Dimension3100	4,012	Max 12"	Surface measurement of large diameter wafer
	G-24	Laser/white light confocal microscope	Lasertec OPTELICS HYBRID LS-SD	4,684	Max 6"	3D surface measurement, laser/white light, conforcal/non-conforcal
	G-25	Line-focus-beam acoustic microscope #1		3,302	Max 6"	Measurement of leaky SAW (LSAW) velocity of solid sample
	G-26	Line-focus-beam acoustic microscope #2		3,302	Max 8"	Measurement of acoustic velocity of bulk wave of solid sample
	G-27	FIB	SII SMI9200	9,416	Chip	Focus ion beam etching
	G-28	XRD	Bruker AXS D8 DISCOVER	7,308	Max 6"	High temp available