

ISIM2011

International Symposium on Integrated Microsystems



Hands-on Access Fabrication Facility

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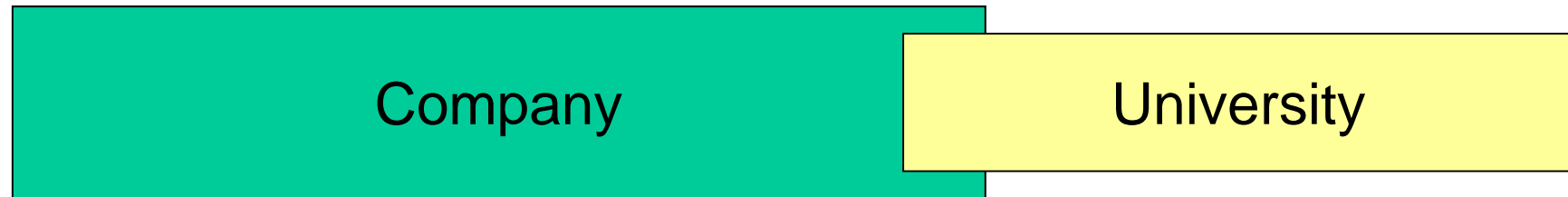


Requirement for MEMS development

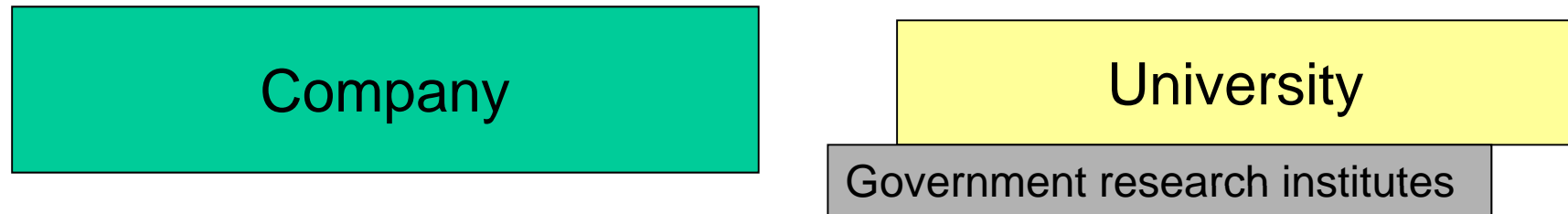
- Development of design, process and evaluation in individual cases > No standard !
- Expensive facility (clean room) and equipment
- Trained engineer
- Much know-how
- Human network

Much time and cost

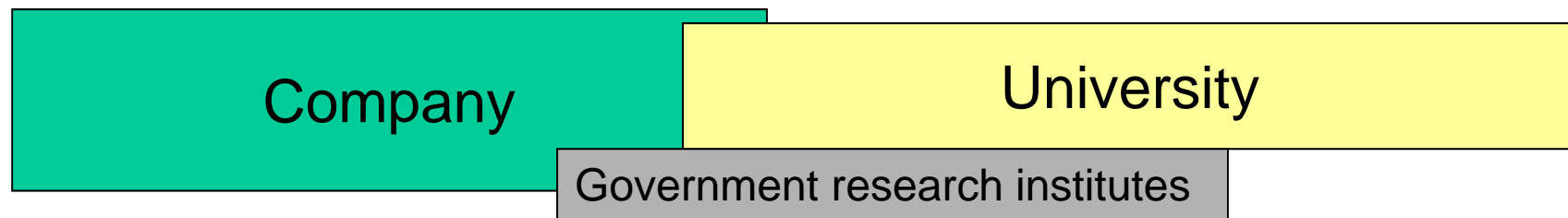
In the past



At present



In future



Application

Facility for prototyping

Basic

Hands-on access fab.

The “Hands-on access fab.” is a facility that companies can easily access and utilize for their prototyping or small volume production. The fab. is shared with other users and managed with best efforts.

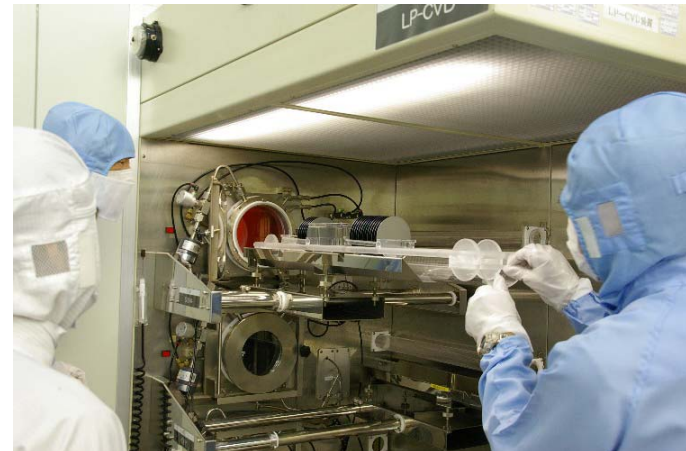
The fab. will not make contract development like MEMS foundry. Companies which have not own facility can dispatch their people to operate equipments by themselves.

The contract development can be made in MEMS foundries as “MEMS Core Ltd.” <http://www.mems-core.com/> .

The fab. is equipped with 4 and 6 inch facilities for semiconductor and MEMS. Companies pay fee depending on usage.

Companies can access accumulated know-how at Tohoku University.

Skilled engineer staffs coach the user.





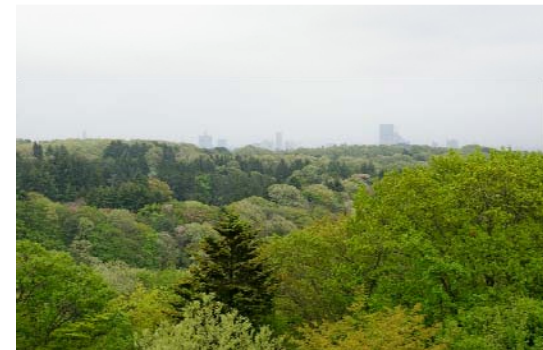
Aoba-yama Campus, Tohoku University

Jun-ichi Nishizawa Memorial Research Center

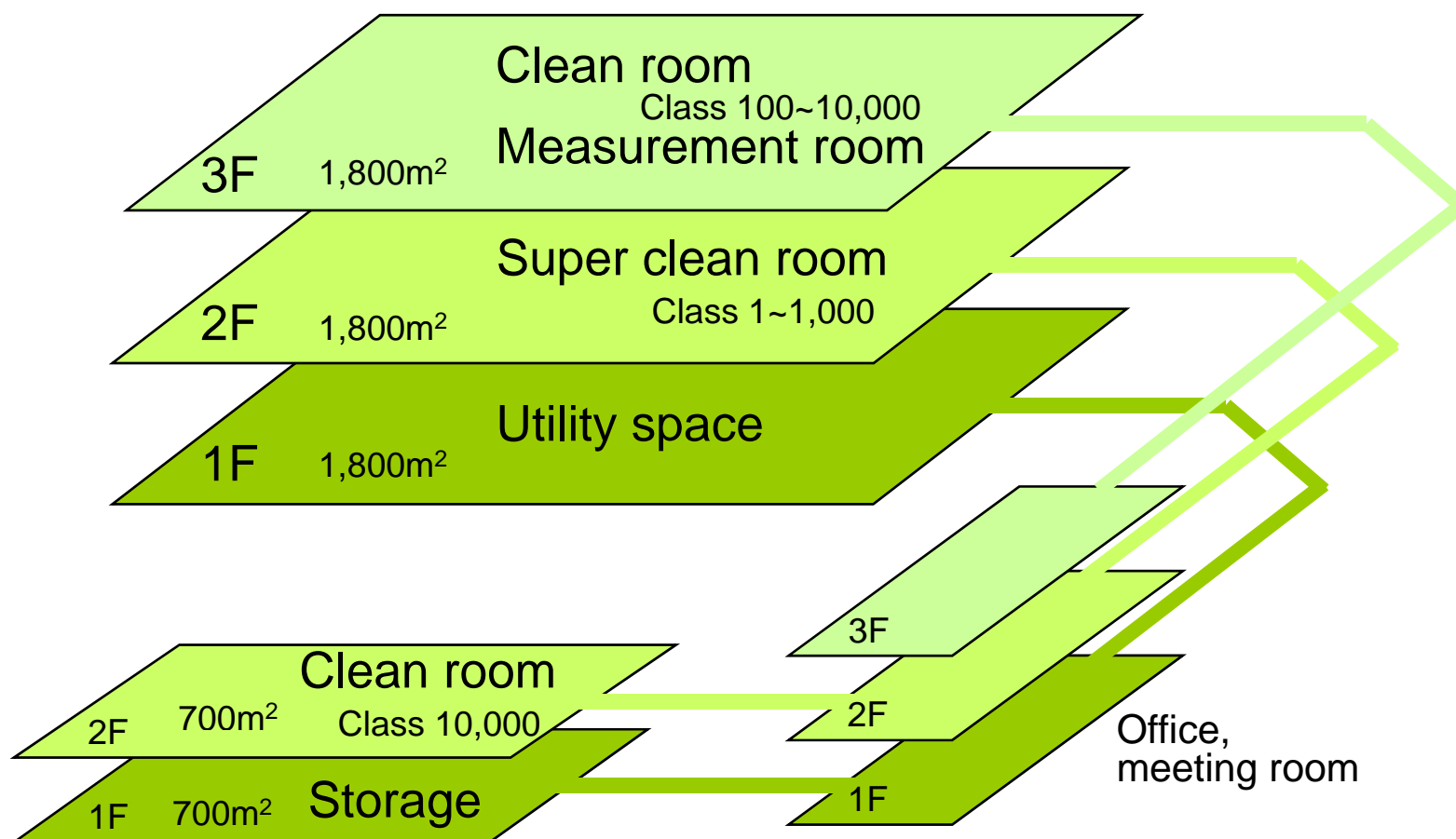
Semiconductor Research Foundation has dissolved in Mar. 2008. Then the property including Semiconductor Research Institute directed by Dr. Jun-ichi Nishizawa was donated to Tohoku University.

Jun-ichi Nishizawa Memorial Research Center has started in Apr. 2008, aiming to contribute advanced and interdisciplinary R&D.

The research center can be utilize for not only internal research at the University, but also development conducted by a company, as well as industry-university collaborative R&D.

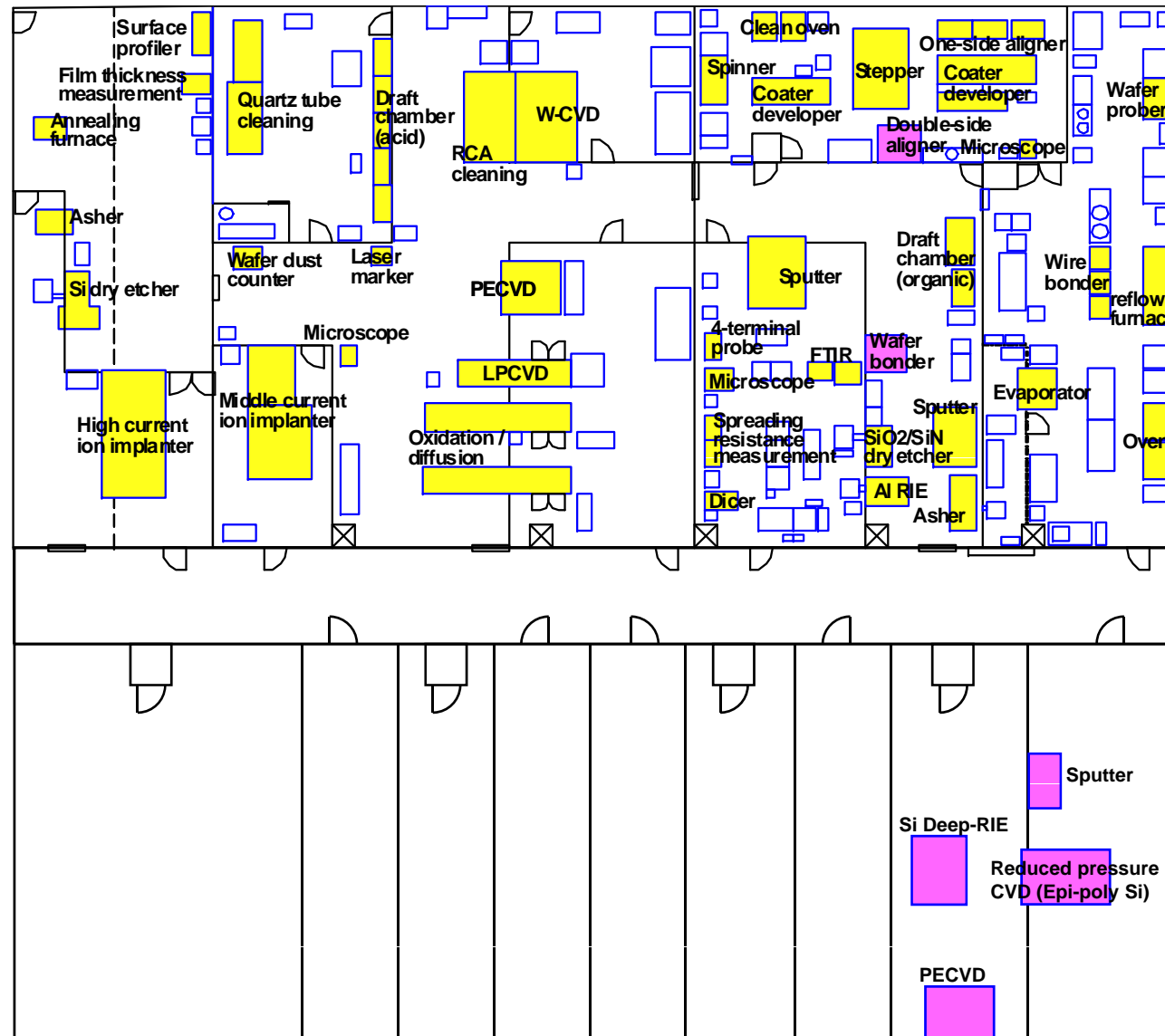


Jun-ichi Nishizawa Memorial Research Center



Total clean room space: ~4,000m²

Layout of the Hands-on access fab. (2nd floor of the Research Center)



1800 m²
Super clean room

2nd floor of the research center



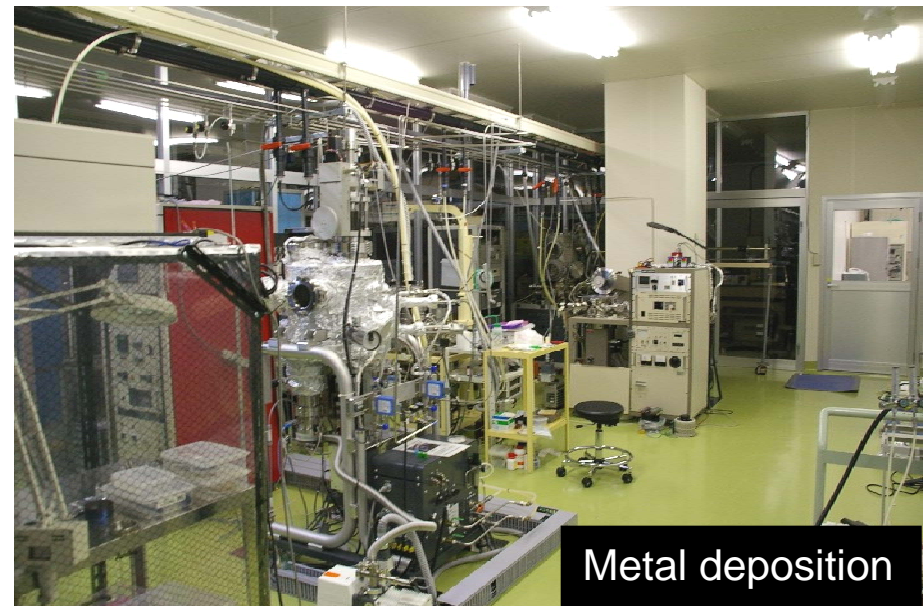
2nd floor of the research center



3rd floor of the research center



3rd floor of the research center



Cleaning, drying



RCA cleaner

ELEC WET-23



Draft chamber

HF/HNO₃/H₂SO₄/HCl etc.



Draft chamber

Organic solvent,
resist removing



Spin dryer

SEMITOOL PSC101



CO₂ critical point
dryer

SCFluids CPD1100



Inert oven

Yamato DN63H



Vacuum oven

Yamato DP-31

Photolithography



Pattern generator

NSK TZ-310
For emulsion / Cr mask
making, up to 7inch



Spin coater

Mikasa 1H-DXII etc.



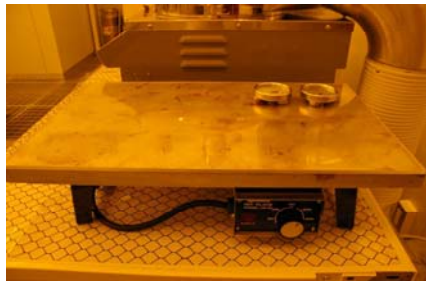
Coater/developer

Canon CDS-630
For positive resist



Coater/developer

Screen
For negative resist



Hot plate



Clean oven

Yamato DE62



Curing furnace

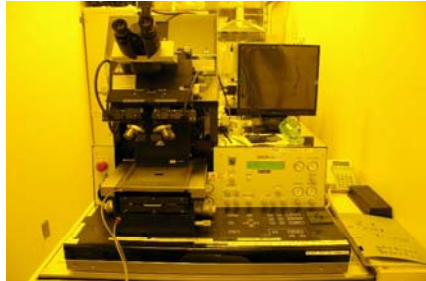
Yamato DN43H
For polyimide



Stepper

Canon FPA1550M4W
g-line, 0.65 μ m, 4inch

Photolithography



Double-side aligner

Suss MA6/BA6



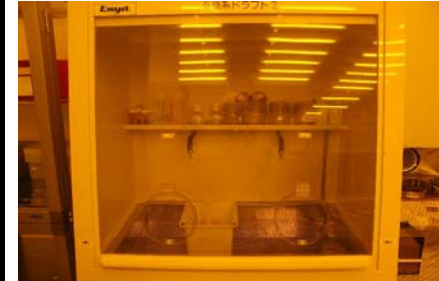
Single-side aligner

Canon PLA-501-FA



EB lithography

Reith 50
30nm, up to 3inch



Draft chamber

For development



UV curing

Ushio UMA-802



Asher

ULVAC UNA2000
2.45GHz, 1kW



Asher

Branson IPC4000
13.56MHz, 600W

Oxidation, diffusion, ion implantation, annealing



Oxidation/diffusion
furnace

TEL XL-7



Middle-current ion
implanter

Nissin ion NH-20SR
200keV, 0.6mA



High-current ion
implanter

Sumitomo eaton nova NV-10
80keV, 6mA



Annealing

AG Associates AG4100
1000°C



Automatic sol-gel
deposition

Technofine PZ-604

CVD, sputtering, evaporation



LP-CVD

Kokusai
SiN, Poly-Si, NSG



Reduced-pressure-
CVD

Kokusai
Epi-Poly Si, 1200°C



PE-CVD

JPEL VDS-5600
SiN, SiO₂



PE-CVD

Sumitomo MPX-CVD
SiN, SiO₂



W-CVD

Applied materials
Precision 5000



Sputtering

Anelva SPF-730
5inch target x 3



Sputtering

Shibaura CFS-4ESII
3inch target x 3



EB evaporation

Anelva EVC-1501

Etching



Si Deep-RIE

Sumitomo MUC-21



Dry etcher

Anelva DEA-506
For SiN, SiO₂ etching



Dry etcher

Anelva L-507DL
For Si etching



Al RIE

Shibaura HIRRIE-100



Draft chamber

For acid



Draft chamber

For alkaline

Measurement



Wafer dust counter

Topcon WM-3



Film thickness measurement

Nanometric
NanoSpec 3000



Surface profiler

Tenchor AlphaStep 500



Depth measurement

Union Hisomet



4-terminal probe



Spreading resistance measurement

Solid State Measurements
SSM150



Wafer prober

Accretech EM-20A

SEM for up to 8inch
wafer will be installed
soon

Bonding, packaging, etc.



Wafer bonder

Suss SB6e



Dicer

Accretech



Wire bonder

West Bond
Al, Au



Cap sealing

Daihen RPT-155



Reflow furnace

Shinko FB-260H/TE



Laser marker

GSI WM-II

How to use Hands-on access fab.

1. Consultation
2. Send application to the Univ.
3. Use facility at Hands-on access fab.
4. Receive bill from the Univ.
5. Payment



Fees

Facility (CR, office, etc.) usage fee : ¥500 /h

Technical assistant fee : ¥2,415 /h

Equipment usage fee : max. ¥7,000 /h

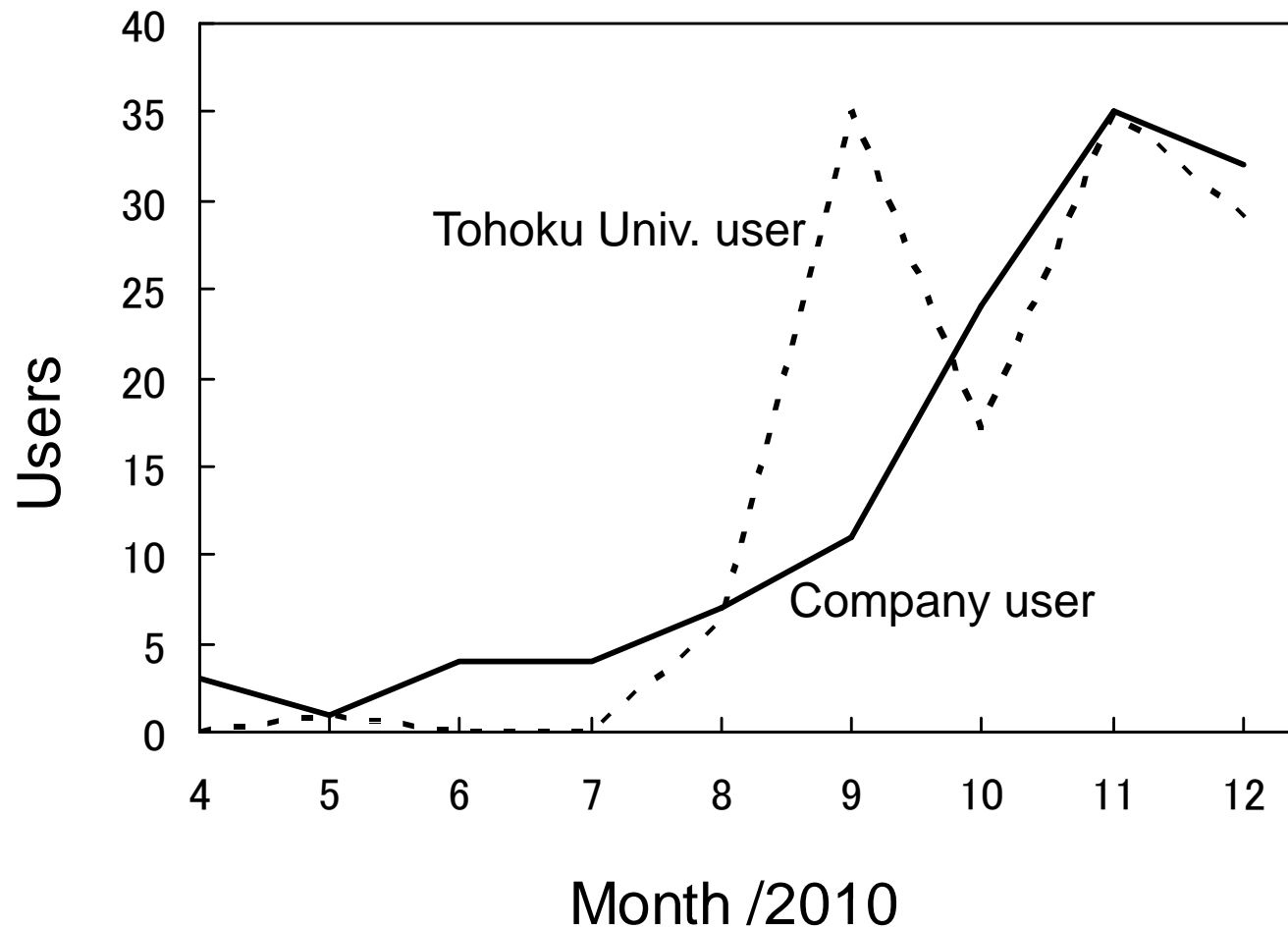
Materials cost

Visit tour is welcome, at any time !

totsu@mems.mech.tohoku.ac.jp +81-(0)22-229-4113

www.mu-sic.tohoku.ac.jp/coin

Utilization of equipment



Activity

Providing the fab. service

Installation, modification and maintenance

Development of system including software

Information sharing, safety course

Process development

Fundamental technology (CVD, photolithography, etching, etc.)

New materials

Evaluation

Training

On the job training

Practical training program organized
by MEMS Park Consortium

Training program for semiconductor
industry in Tohoku region

