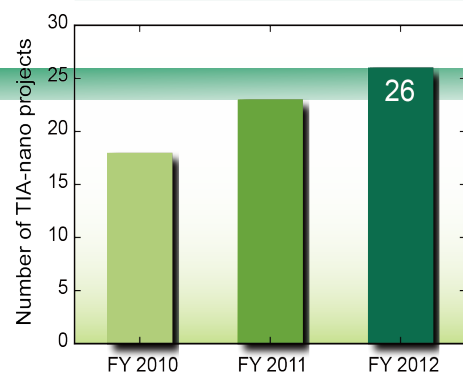


# Nanoelectronics in Japan and TIA

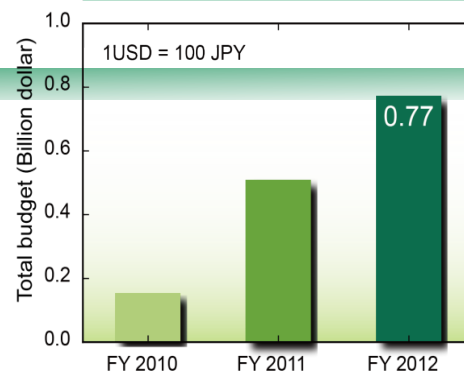
## Part 7 of 7 – Supplemental Slides

October 17 2013  
Shigeo Okaya AIST

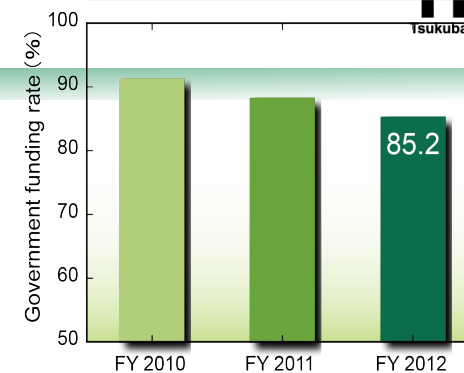
### TIA-nano projects



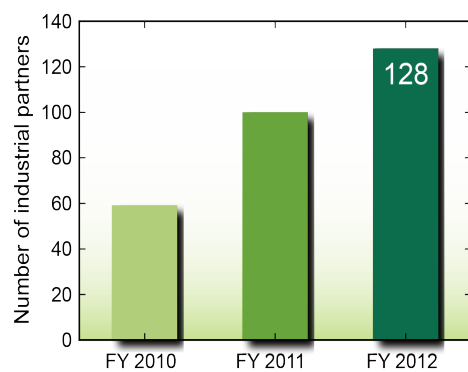
### Total budget



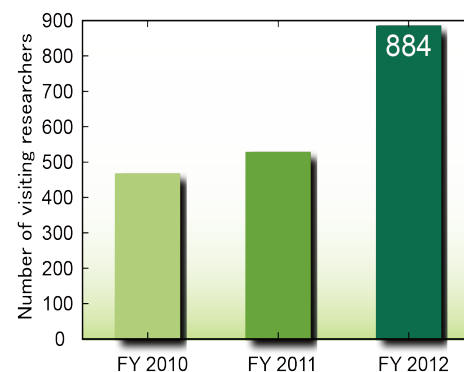
### Government funding rate



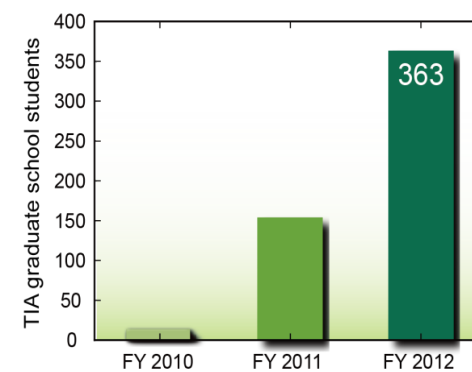
### Industrial partners



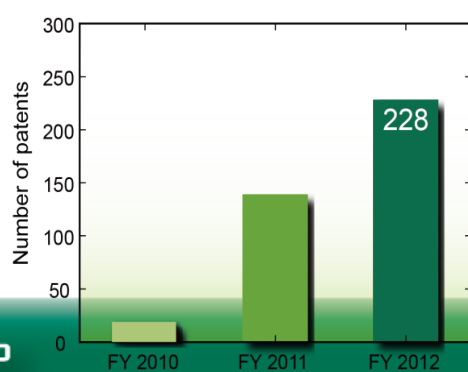
### Visiting researchers



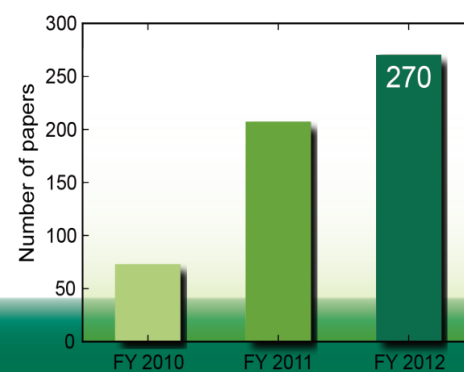
### TIA graduate school students



### Patents



### Papers



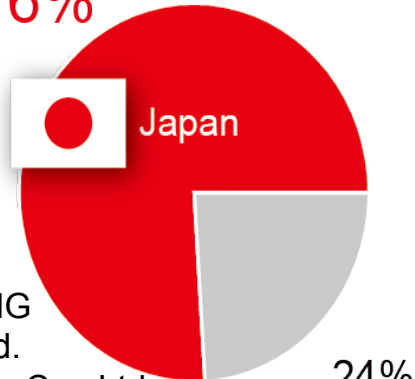
# Technology management within consortia

- Most corporations have in house R&D center
- Inventions @ TIA consortia will be brought back and tested further
- IP rules differ among the consortia
- Usually, IP is patented by most contributed party with MFE implementation right granted to all members.

# Global market share (materials for wafer process)

Reticle

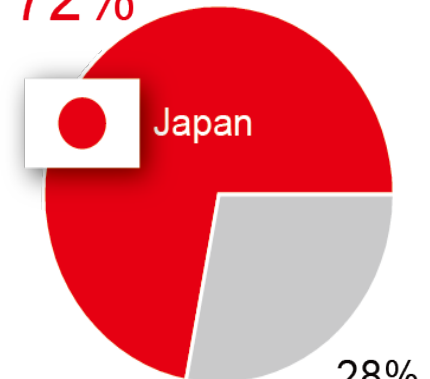
76%



TOPPAN PRINTING  
Co., Ltd.  
Dai Nippon Printing Co., Ltd.  
HOYA

Photo resist

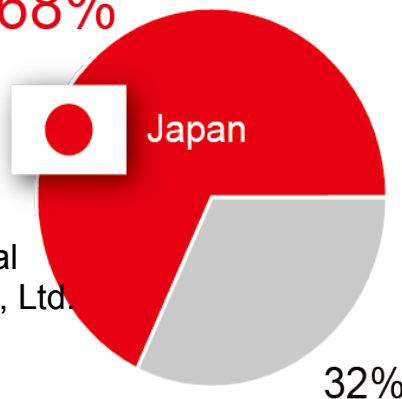
72%



JSR  
TOKYO OHKA KOGYO  
CO., LTD.  
Sumitomo Chemical Company, Limited  
Shin-Etsu Chemical Co., Ltd.

Si wafer

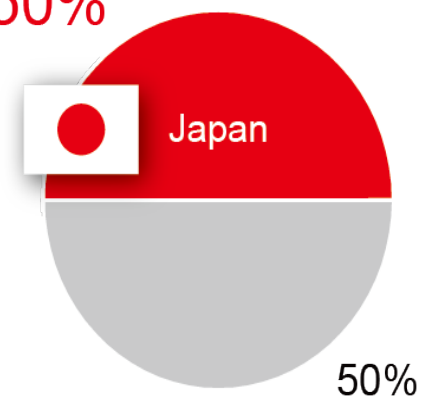
68%



Shin-Etsu Chemical  
Co., Ltd.  
SUMCO

Target materials

50%



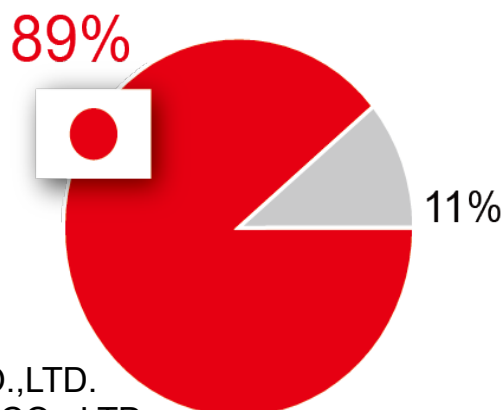
JX Nippon Mining & Metals  
TOSOH CORPORATION

reference: Takashi Yunokami, *Denki-Handoutai Daihoukai no Kyoukun*, Nihonbungeisha, 2012 (ISBN978-4-537-25954-5)

# Global market share

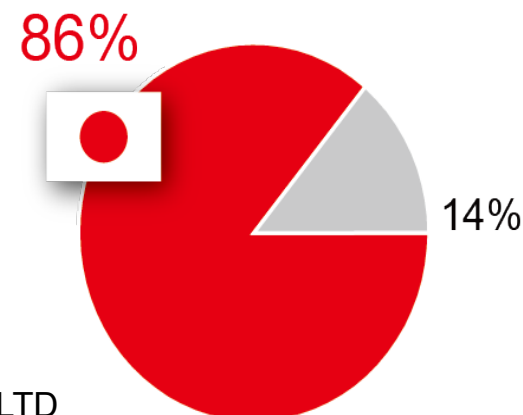
## (materials for assembly and testing process)

Plastic substrate



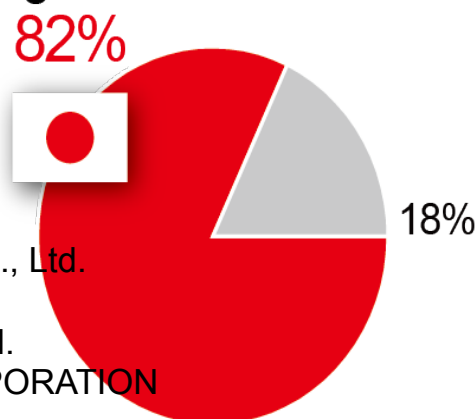
IBIDEN CO.,LTD.  
SHINKO ELECTRIC  
INDUSTRIES CO.,LTD.  
NGK SPARK PLUG CO., LTD  
Eastern Co., Ltd.  
Japan Circuit

Ceramics substrate



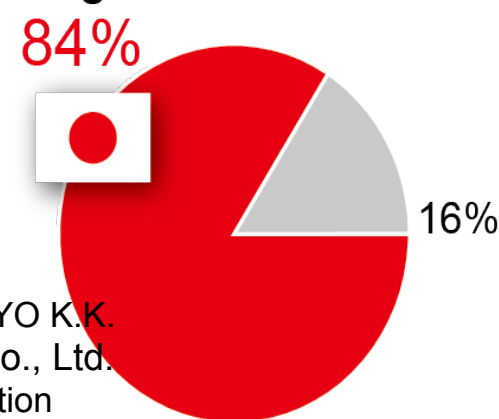
KYOCERA Corporation  
NGK SPARK PLUG CO., LTD  
Sumitomo Metal Mining Co., Ltd.

Sealing materials



Sumitomo Bakelite Co., Ltd.  
Hitachi Chemical  
Company, Ltd.  
NITTO DENKO CORPORATION  
etc.

Bonding wire

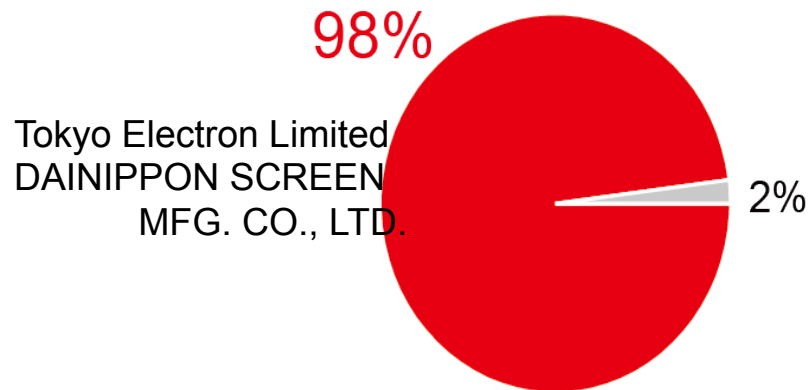


TANAKA KIKINZOKU KOGYO K.K.  
Sumitomo Metal Mining Co., Ltd.  
Nippon Micrometal Corporation

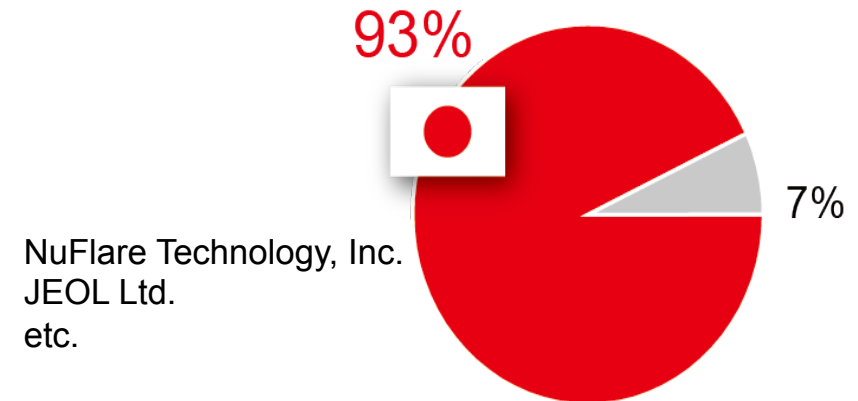
reference: Takashi Yunokami, *Denki-Handoutai Daihoukai no Kyoukun*, Nihonbungeisha, 2012 (ISBN978-4-537-25954-5)

# Global market share (semiconductor production equipment)

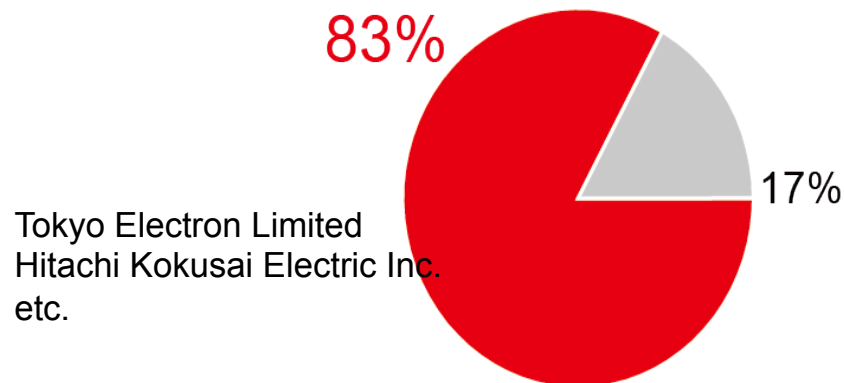
## Coater developer



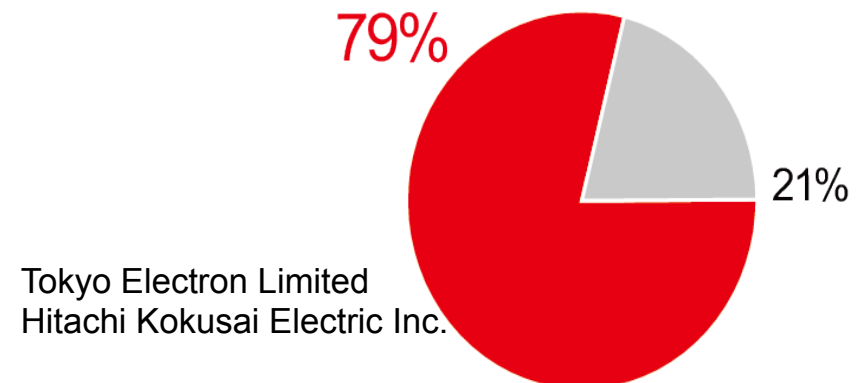
## E-beam lithography



## Furnace (oxidization/diffusion)



## Low-pressure CVD



reference: Takashi Yunokami, *Denki-Handoutai Daihoukai no Kyoukun*, Nihonbungeisha, 2012 (ISBN978-4-537-25954-5)

# Tsukuba International Strategic Zone

## ■ Tsukuba is one of the 7 international strategic zones in Japan.

\*Seven international strategic zones designated by the national government in 2011.

- Hokkaido Food Complex International Strategic Zone (Hokkaido)
- **Tsukuba International Strategic Zone** (Ibaraki)
- Asian Headquarters Tokyo (Tokyo)
- Life Innovation in Keihin Costal Areas (Kanagawa)
- The Special Zone to Create Asia's No.1 Aerospace Industry Cluster (Aichi & Gifu)
- Kansai Innovation International Strategic Zone (Kyoto, Osaka, Hyogo)
- Green Asia International Strategic Zone (Fukuoka)



The center of Tsukuba Science City

## ■ What's the international strategic zone?

→ The governmental policy to accelerate **commercialization of R&D** and creation of globally competitive new industries



Various support measures are provided to approved R&D and related projects. (\*e.g. governmental subsidies, deregulation, tax reduction etc.)



# Projects of Tsukuba International Strategic Zone

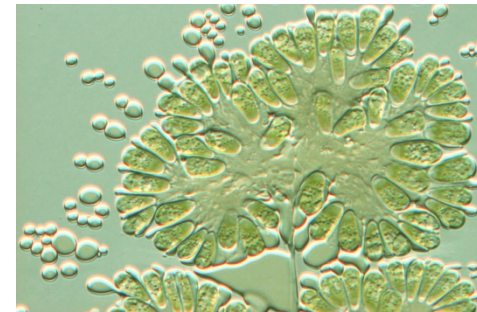


## ■ Four pioneering R&D projects underway (\*as of October 1, 2013)

1. Next-generation cancer therapy (BNCT)



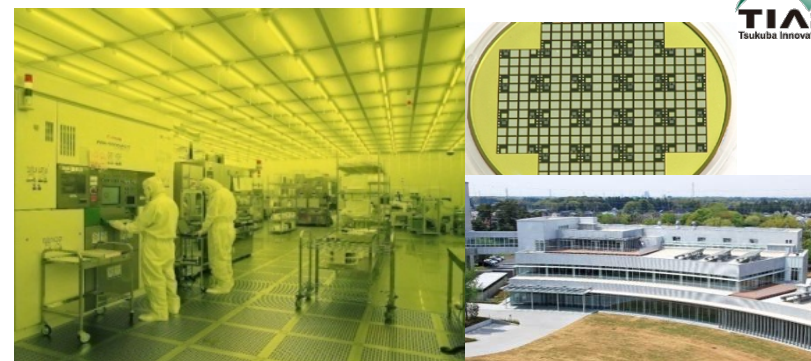
3. Practical use of algal biomass energy



2. Application of personal service robots



4. TIA-nano (Tsukuba Innovation Arena for Nanotechnology)  
Open global hub of nanotechnology



\*Additionally other three projects are to be approved in late 2013.



# Tsukuba, a treasure house of “seeds of innovation”

## A great stock of research resources



Tsukuba Science City boasts a great stock of research resources from the cluster of cutting-edge academic institutes, universities and private companies.

## Tsukuba Global Innovation Promotion Agency

\*The hub agency to promote the innovation ecosystem of Tsukuba Science City

Organize strategic conferences

Create opportunities / infrastructures of joint activities for innovation

Support industry-academia-government collaborations and commercialization of R&D

Develop / utilize human resources

Globalization

Center of information



## Commercialization of R&D / Innovative new industries

With a largest stock of research resources in Japan and academic-industry-collaborations, whole Tsukuba Science City works in unity as the stage to make innovation constantly toward the global market.

**Tsukuba Global Innovation Promotion Agency**

[URL] <http://tsukuba-gi.jp/en/>

[E-mail] [global.innovation@un.tsukuba.ac.jp](mailto:global.innovation@un.tsukuba.ac.jp)

Tsukuba Innovation Arena