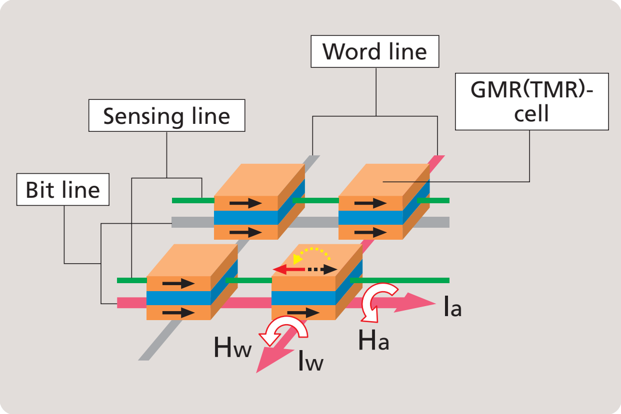
Nano Technology

Network nano device

Fast, Large capacity, Non-volatile Memory (MRAM) is needed in IT society



MRAM Production PVD System

Apparatus of Carbon Nanotube

Apparatus of Graphite Nanofiber

Carbon Nanotube Market

Semiconductor

MOSFET

2007~
Via Connection
Transistor
FET

Digital Sputtering System

Laser Diode edge coating
Optical Fiber edge coating

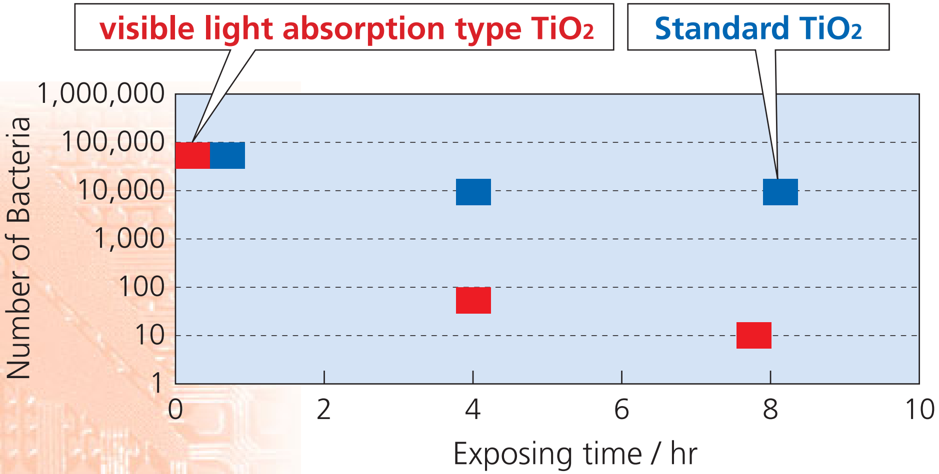
Sputtering system for mass production

Nano biotechnology

Titanium dioxide (TiO_2) is known to exhibit photocatalysis well. To acquire high photocatalytic performance, it is needed to be exposed to UV light corresponding to the band gap energy of 3.2ev. ULVAC succeeded in the development of visible light excitation type photocatalysts which are nitridized by means of heating in ammonia gas and absorb the visible light due to the narrow band gap.

Experimental condition

- illuminance : 1000 lx (UV-filtered)
- specific name of bacterium: staphylococcus



Apparatus for visible light excitation type photocatalysts TiO_2

ULVAC, Inc.


Photocatalyst Evaluation checker PCC-2

ULVAC-RIKO,Inc.

The number of staphylococci slightly decrease on the standard TiO_2.
On the other hand, the visible light excitation type TiO_2 exterminated staphylococci after exposure of light from UV-filtered fluorescent lamps for 8 hours.

Nano environmental energy

As the next generation's deposition technique, ULVAC is conducting research on the solar cell deposition process based on the catalysis deposition (CAT-CVD) method and development of an ultra-large size CAT-CVD system for mass production.


CIV1500-CAT
ULVAC, Inc.

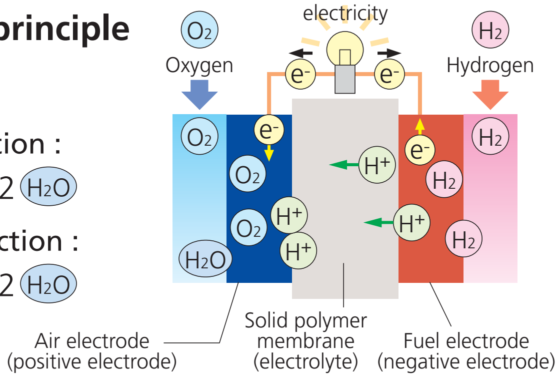
Power generation principle of PEFC

Positive electrode reaction :

$O_2 + 4\,H^+ + 4\,e^- \rightarrow 2\,H_2O$

Negative electrode reaction :

$2\,H_2 + 4\,H^+ + 4\,e^- \rightarrow 2\,H_2O$



For producing solar cell electrode layer

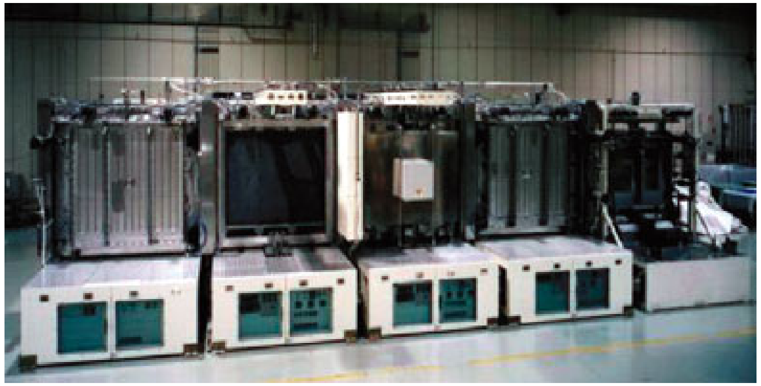
SDP-VM, VT Series

ULVAC, Inc.

For producing Amorphous Si solar cell

CCV Series

ULVAC, Inc.

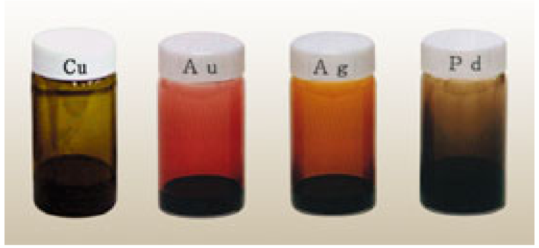


Nano Technology

ULVAC Solutions

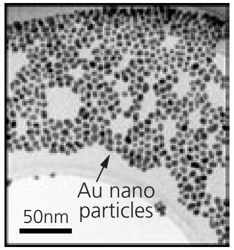
Revolutionary material

Individually dipersion nano metal particle Solution



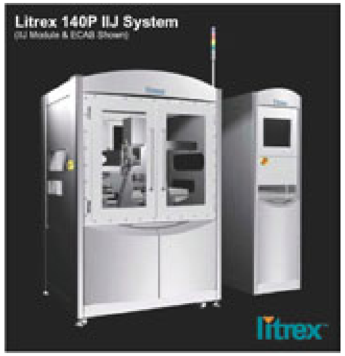
TEM image for nano particles

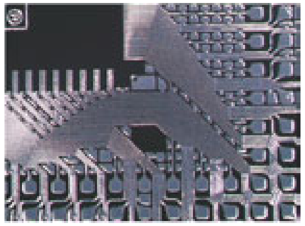
ULVAC Materials, Inc.



Litrex 80L

Litrex 140P

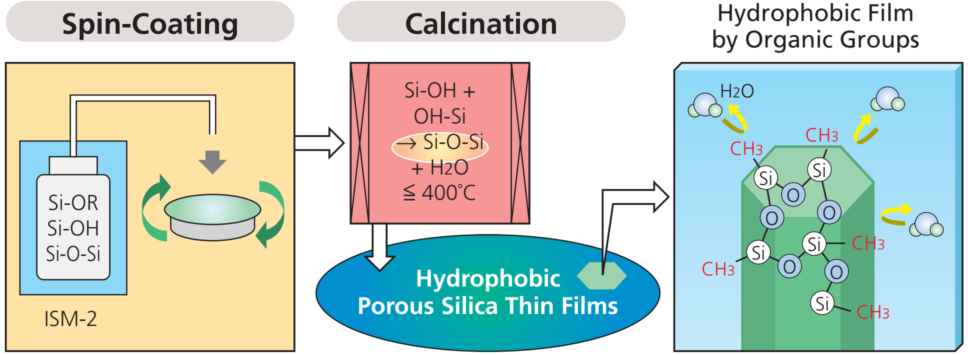




Ag Film Pattern by Screen Printing
on Polyimide Substrate

ULVAC,Inc

Deposition Process



Spin-Coating → Calcination → Hydrophobic Film by Organic Groups

Si-OR
Si-OH
Si-O-Si

ISM-2

Si-OH + OH-Si
→ Si-O-Si
+ H_2O
≦ 400°C

Hydrophobic Porous Silica Thin Films

Easy Process

High moisture resistance

Application

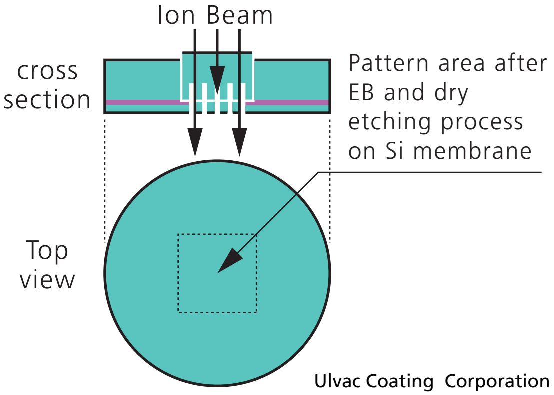
- **Using Physical Properties**
  - **Low-k Dielectric**
    - For Semiconductors
    - For FPD's
  - **Heat-Resistance Dielectric** ≧ 700°C
  - **Low Refractive Films**
  - **Heat Insulating Films**
    - Light Retrieval Windows (OEL, FED, etc.)
    - Anti-Reflective Films
    - Optical Waveguide
- **Using Nanostructure**
  - **Liquid-Crystal Alignment Films**
  - **Molecular Adsorption Films**
  - **Etc.**

Nano Technology

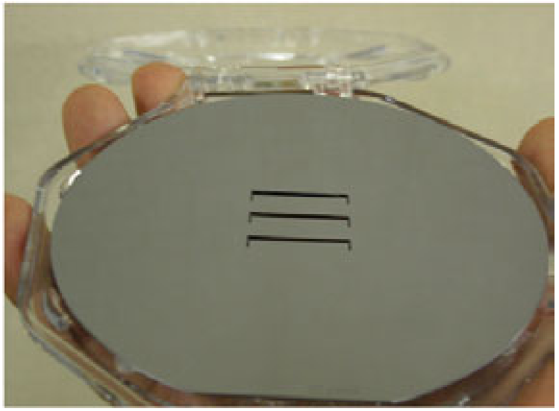
Nano measurement and processing

Concept of Stencil Mask
(SOI wafer)

Application: ex.SLIM
(Stencil mask Lithographic Ion implanter)

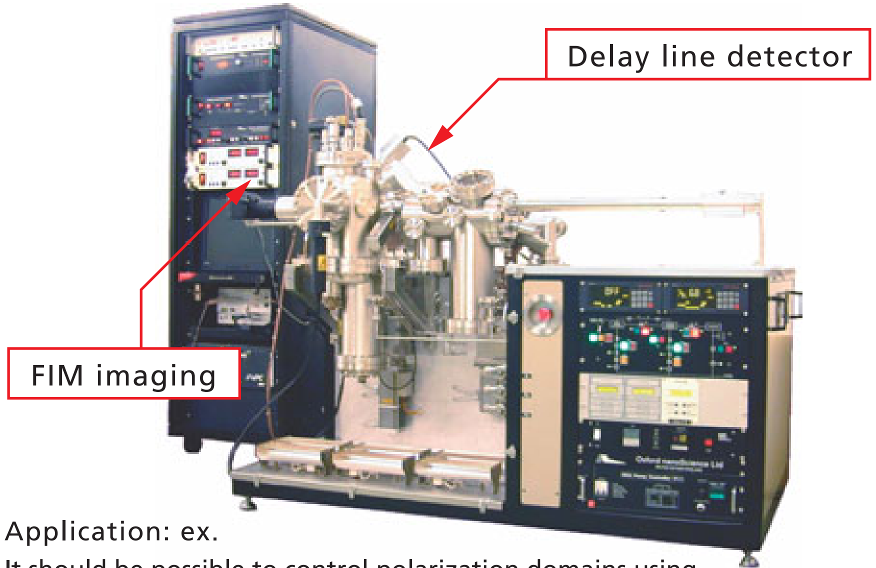


Ulvac Coating Corporation



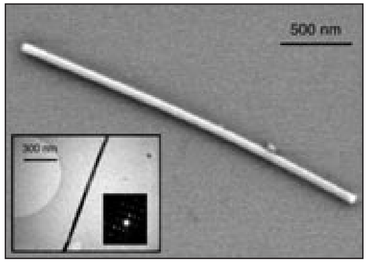
Nano scale chemical identity using 3D-AP

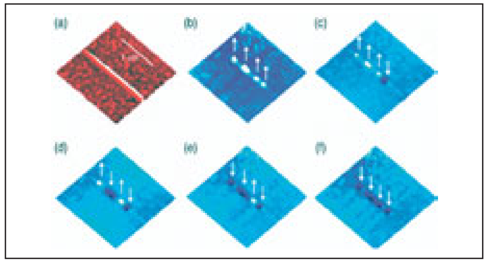
ULVAC-PHI, Inc.



Application: ex.

It should be possible to control polarization domains using non-contact AFM on the ferroelectric properties of nanowire to apply the voltage to the conductive cantilever.





non-contact AFM head