Purification

High Corrosion Resistant Plating

Surface treatment

Fluorine Chemicals

Industrial gases

Supercritical Carbon Dioxide (CO₂)

SHOWA DENKO GAS PRODUCTS

SOLFINE™

High-purity gases/solvents for electronics

Clean-S™

Specialty gas chemicals

Mixing/dispersion

High-heat processing

Plastic recycling

Clean-S™

SHOWA DENKO GAS PRODUCTS

Silicon semiconductors

Compound semiconductors

Liquid crystals

Solar batteries

H₂Se

HCl

NF₃

NH₃

CF₄

Cl₂

SF₆

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High-purity gases/chemicals for electronics
〜 for most advanced semiconductors 〜

**Example products**

High-purity gases / chemicals are used in the electronic industry for, for example, most advanced semiconductor manufacturing processes and FPD production processes.

**Our technologies**

Using purification technologies of “distillation, extraction, and filtration,” high-purity gases for semiconductors are manufactured.

To ensure the quality of the products, we own technologies including the following:

- Technology to treat and clean the inside of containers
- Sensitive analysis technology (LC, GC, ICP-MS)
- Plant construction and mass production technology

Plant to fill high-purity solvents

Sensitive analysis instrument (ICP-MS)
Fluorine Chemicals

Example products
Fluorine compounds are used for dry-cleaning, whereby the dirt adhering to the reactor of semiconductor manufacturing devices is converted into gaseous substances to clean the devices.

Taking advantage of such characteristics, fluorine chemicals are used for dry-cleaning, whereby the dirt adhering to the reactor of semiconductor manufacturing devices is converted into gaseous substances to clean the devices.

Our technologies
Fluorine is an atom that can easily combine with any element. Utilizing such characteristics of fluorine, our fluorine technologies are applied to various products.

We own technologies including the following:

- Fluorine synthesis technology \((2\text{HF} \rightarrow \text{F}_2 + \text{H}_2)\)
- Fluorine compound synthesis technology (gas phase)
- Fluorine compound synthesis technology (liquid phase)
- Sensitive analysis technologies (LC, GC, ICP-MS)
- Plant construction and mass production technology

Example products

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Plant for synthesizing fluorine compounds

Semiconductor/FPD manufacturing instrument
Example products

We undertake the treatment of metal surfaces to prevent corrosion, such as cylinders, pipes, and valves.

Such treatment is used for various applications, such as semiconductor manufacturing device components, vacuum pumps (molecular pumps, dry pumps), and plastic injection molding machines.

Our technologies

- Surface treatment technology

We own the technology to improve corrosion resistance performance by forming nickel alloy films on SUS and aluminum using an electroless plating process.

We have also developed our own passive state treatment technology to form NiF2 films through the reaction of fluorine gas, thus achieving high corrosion and abrasion resistance.
Supercritical Carbon Dioxide (CO$_2$)

Product Example

The use of supercritical CO$_2$ enables processes that conventionally needed organic solvents as well as processes not possible with organic solvents.

Supercritical CO$_2$ painting system

Our technologies

- Supercritical CO$_2$ application technology

Features of supercritical CO$_2$

1. Dissolves organic substances well.
2. Can be dissolved well in resins to reduce their viscosity.
3. Can be discharged as a gas when the pressure is reduced to atmospheric pressure.

Applications of supercritical CO$_2$

1. Cleaning/drying: Precision removal of even infinitesimal amounts of ingredients
2. Dyeing/impregnation: Transferring effective ingredients to nano-sized spaces
3. Painting: Alternative to a dilution solvent
4. Creating a fine powder: Using the bubbling and cooling effects when sprayed
5. Macromolecular polymerization: Reaction field with no residual solvent
# Contact Us

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| **High-purity gases/chemicals for electronics** | Solfine Department Electronic Chemicals Division | **TEL**: +81-834-64-0806  
|                                         |                                                 | **FAX**: +81-834-62-0997                       |
|                                         | Solfine™ for LCD                                 |                                               |
| **Fluorine Chemicals**                  | Specialty Gases Department Electronic Chemicals Division | **TEL**: +81-44-520-1362  
|                                         |                                                 | **FAX**: +81-44-520-1366                       |
|                                         | High-purity HFC-23                               |                                               |
| **High Corrosion Resistant Plating**    | Specialty Gas Equipment Department Electronic Chemicals Division | **TEL**: +81-44-520-1364  
|                                         |                                                 | **FAX**: +81-44-520-1366                       |
|                                         | Clean-S™                                         |                                               |
| **Supercritical Carbon Dioxide (CO₂)**  | SHOWA DENKO GAS PRODUCTS CO., LTD.               | **TEL**: +81-44-223-9512  
|                                         |                                                 | **FAX**: +81-44-520-8910                       |
|                                         | Supercritical CO₂ Apparatus                      |                                               |

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Corporate R&D Department  
Showa Denko K.K.

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**Ideas, hopes and dreams for your happily ever after.**