



Advanced Solutions for the Semiconductor Industry

AGC

Your Dreams, Our Challenge

AGC Solutions: Innovating the Future of Semiconductor Manufacturing

AGC is a global leader in advanced materials and chemical solutions, delivering innovation across the semiconductor value chain.

Our comprehensive portfolio of high-performance materials supports the evolving needs of both front-end and back-end semiconductor manufacturing.

Products include Glass Carrier for advanced packaging, Through Glass Vias, CMP Slurry, Post CMP Cleaner, PCB materials, as well as film, resin products, ceramics and plasma-resistant coatings. These solutions enable innovation from front-end fabrication to advanced packaging, driving progress in global chipmaking.

AGC is also advancing fluorinated material recycling, aligned with our vision of "Chemistry for a Blue Planet," to contribute to an environmentally friendly and sustainable recycling-oriented society.



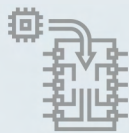
Patterning



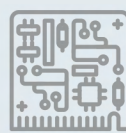
CMP



Molding



**Advanced
Packaging**



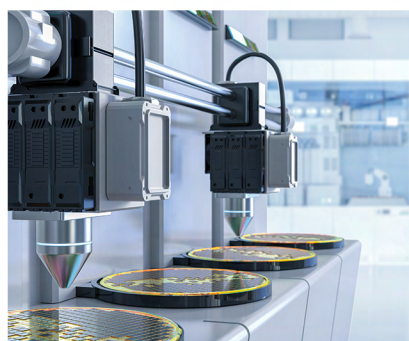
PCB



For Equipment



Circularity

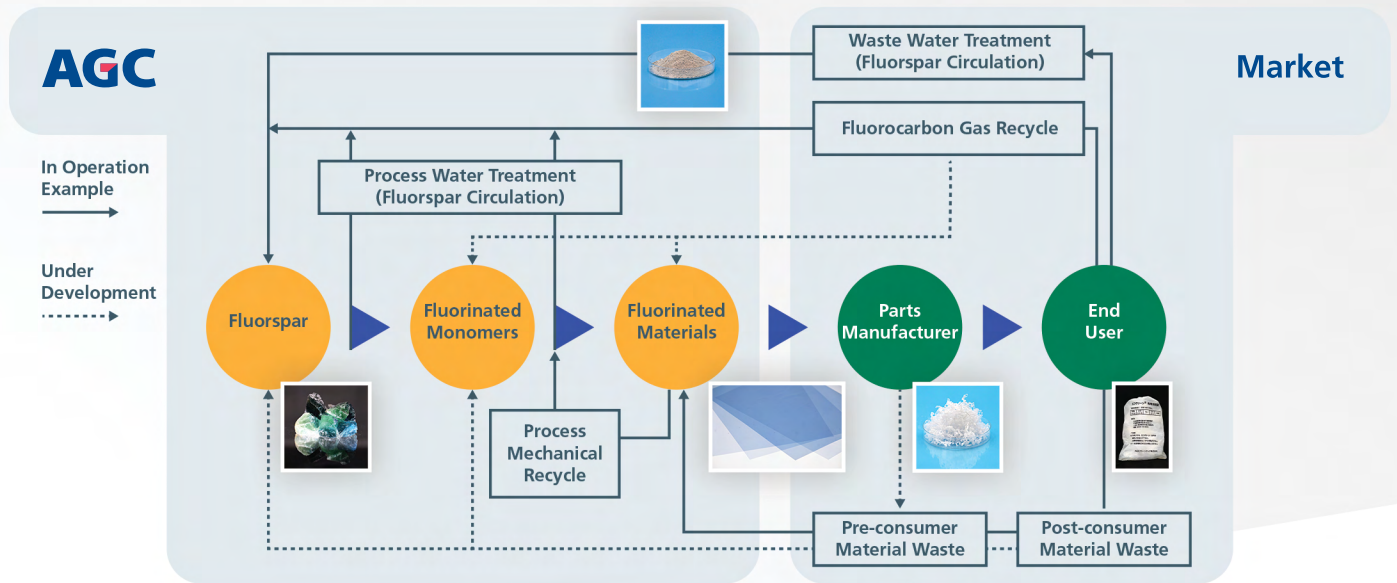
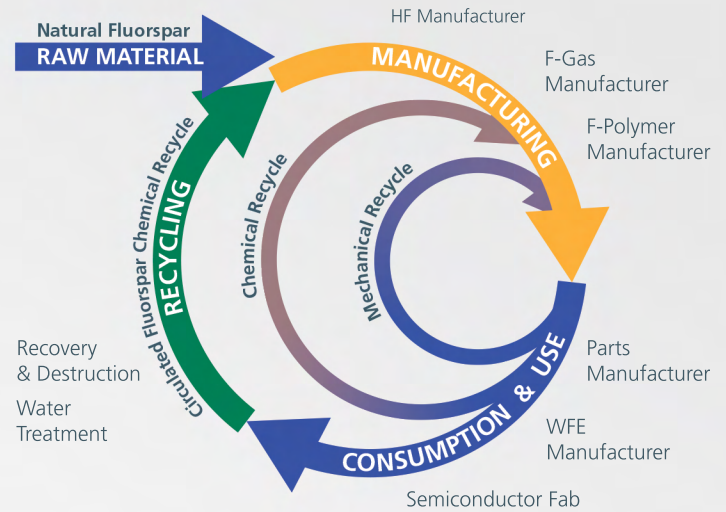




Circularity

Forging a Fluorine Circular Economy

- **Collaborative Innovation:**
Uniting stakeholders across the semiconductor supply chain to drive sustainable change.
- **Integrated Recycling:**
Combining diverse recycle strategies to ensure a resilient fluorine lifecycle.



Environmentally Friendly Fluorinated Solvents

Features

- Non-flammable
- Thermally and chemically stable
- Very low global warming impact (GWP < 1)
- Good solubility for oils

Applications

- Heat transfer fluid for semiconductor manufacturing equipment
- Cleaning agent for semiconductor manufacturing equipment parts





Patterning

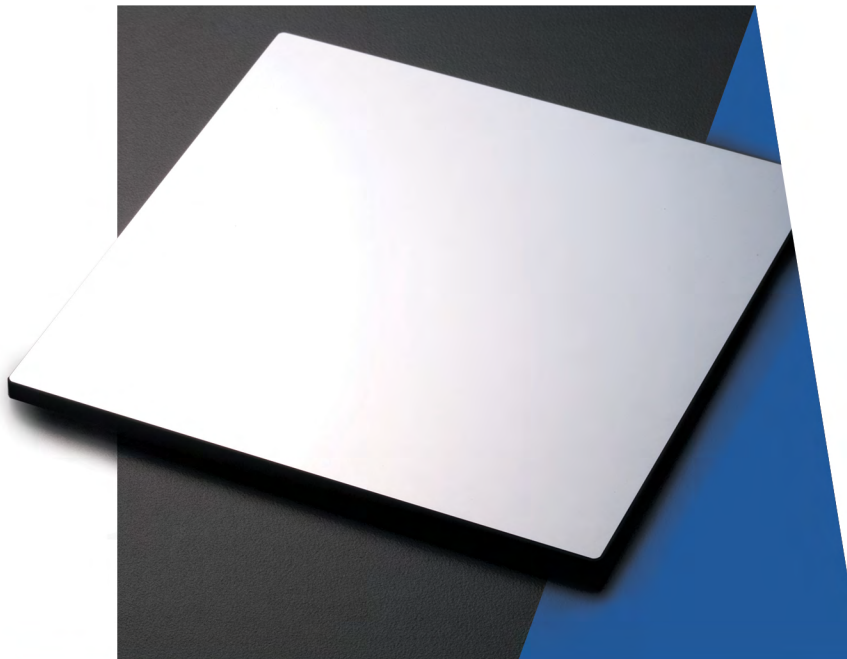
EUV Photomask Blanks

Features:

- Structure: glass substrate with optical coatings to control the EUV light (wavelength 13.5 nm)
- Quality: no particulate contamination as small as EUV light wavelength (13.5 nm), with zero thermal expansion

Applications:

- Consumable material essential to the state-of-the-art semiconductor devices such as GPU, CPU, APU and DRAM



CMP



Ceria Slurry for Semiconductor CMP Process

Features

- Abrasive particles designed and manufactured in-house
- Flexible formulation capabilities to meet diverse customer requirements
- Advanced abrasive technology to minimize scratch
- High oxide removal rate
- Excellent planarity with customizable selectivity across different films

Applications

- Shallow Trench Isolation (STI)
- Polishing silicon-based materials (Si, poly-Si, SiO₂, SiN)
- Interlayer Dielectric (ILD)
- Back-end and packaging processes (Cu, PI, epoxy resin)



Post CMP Cleaner for Ceria Slurry

Features

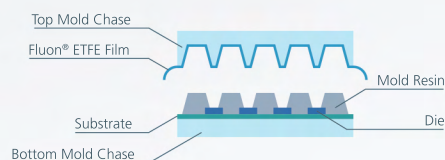
- Designed specifically for AGC ceria slurry
- Highly effective in removing ceria particles and cerium ions
- Low etching rate for Ox and SiN substrates
- Good compatibility with copper

Applications

- Cleaning solution for ceria slurries – applicable to both positively and negatively charged slurries



Molding



Fluon ETFE Film

Features

- Heat and chemical resistant
- High mechanical, anti-stick and electrical properties
- Light transmittance
- Weatherability

Applications

- Release films for semiconductors, LED lens, PCB and CFRP
- Decal films for making CCMs for fuel cells and water electrolysis
- Protective films for solar cell surface, rubber closures, and other protective applications
- Structural materials for architecture, sports stadiums and greenhouses



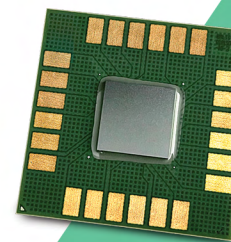
Low Dielectric Underfill Materials

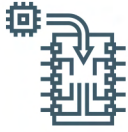
Features

- Low dielectric constant ($Dk \leq 2.9$)
- Low viscosity and low CTE
- High Tg and low storage modulus

Applications

- FC-BGA (Flip Chip-Ball Grid Array)
- FC-CSP (Flip Chip-Chip Scale Package)
- Semiconductor packaging





Advanced Packaging

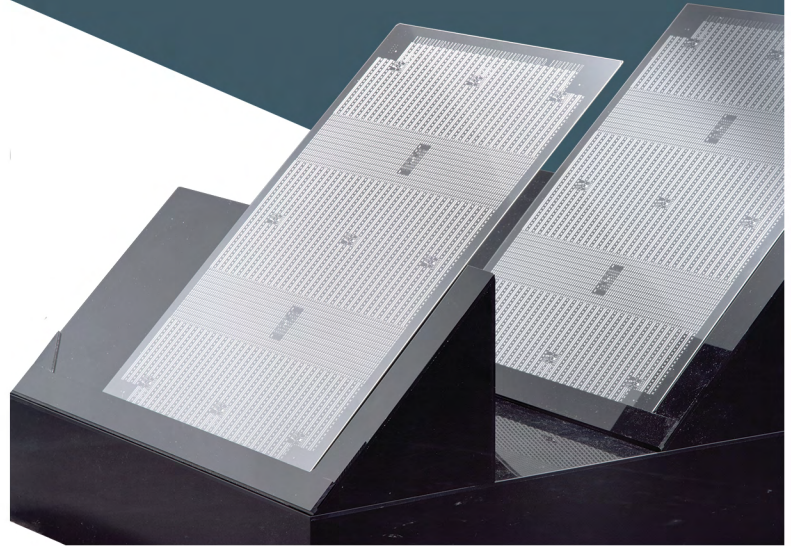
TGV Glass Substrate for Advanced Packaging

Features

- Available in a wide variety of glass composition and thickness (0.2~1.0 mm)
- Precise fine-pitch small TGV and cavity formation
- High aspect ratio (supporting up to 20:1) at 1.0 mm thickness
- High modulus and CTE adjustability for warpage control
- Panel format production (e.g. 510 x 515 mm)

Applications

- Glass core for advanced packaging (e.g. chiplet packaging substrate)
- RF device (e.g. integrated passive device, antenna in packaging)



Glass Carrier for Semiconductor Packaging

Features

- Supporting both wafer size and panel size
- Supporting a wide range of CTEs from 3 ppm/K to 12 ppm/K
- Providing high-quality glass due to excellent processing capabilities

Applications

- Glass carrier for wafer level, panel level packaging
- Silicon wafer thinning process



Extreme Low Dk/Df Build-up Film

Features

- Extreme Low Dk/Df ($Dk/Df=2.5/0.0015$)
- Low warpage (low Young's modulus and low CTE)

Applications

- FC-BGA
- HDI PCB (smartphone, etc.)
- Antenna, Antenna-in-Package (AiP)



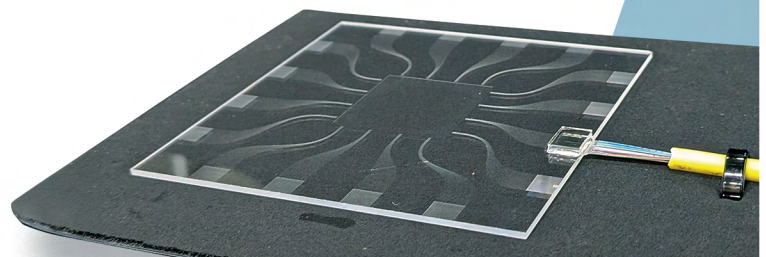
Optical Interface for Si-Photonics & CPO Polymer & Glass Optical Waveguide (PWG and GWG)

Features

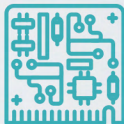
- High transmittance (O-band / C-band)
- Reflow compatibility / high-power laser durability
- Fine patterning by photolithography

Applications

- Fiber to chip interconnect with pitch conversion
- Chip to chip / package to package interconnect



PCB



For Equipment

3D-Formed Silica Glass

Features

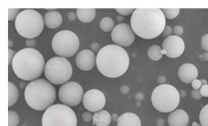
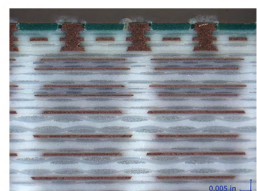
- UV transparent (quartz)
- Hard-to-machine 3D form
- Aspherical lens and lens array
- Deep SAG lens and lens array

Capabilities

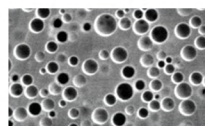
- Lens design available
- Small-lot prototyping available

Applications

- Lens array (fry-eye, LA for LED, LD collimator, etc.)
- Semiconductor manufacturing equipment parts (heat-reflective quartz plate, etc.)



RESIFA HNP-20B
for Low-Df



RESIFA HS-070
for Low-Dk

Copper Clad Laminate (CCL)

Features

- Extreme low loss ($Df < 0.001$)
- Stable dielectric performance over a wide frequency & temperature range
- Prepreg and laminate constructions

Applications

- High-speed digital PCB
- Telecommunication
- Aerospace
- High-end computing

Silica Fillers for Electronic Use

Features

AGC has developed two types of silica fillers:

- Low-Dk hollow silica HS series
- Low-Df silica HNP series

Applications

- Adjusts dielectric properties of copper clad laminates, films, molded plastics and PCB boards



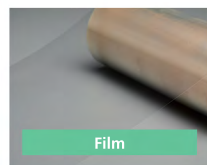
Low Dielectric Fluoropolymer for High-Frequency PCBs

Features

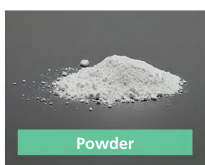
- Low dielectric constant (2.0) and low dissipation factor (0.001)
- Excellent adhesion to low-profile copper foils – minimizes loss and delay for high frequency applications
- Stable dielectric constant versus temperature and frequency

Applications

- 5G mobile devices including high-end smartphones and PC's
- Automotive radar applications
- Base stations and other mmWave applications



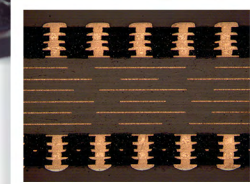
Film



Powder



Dispersion



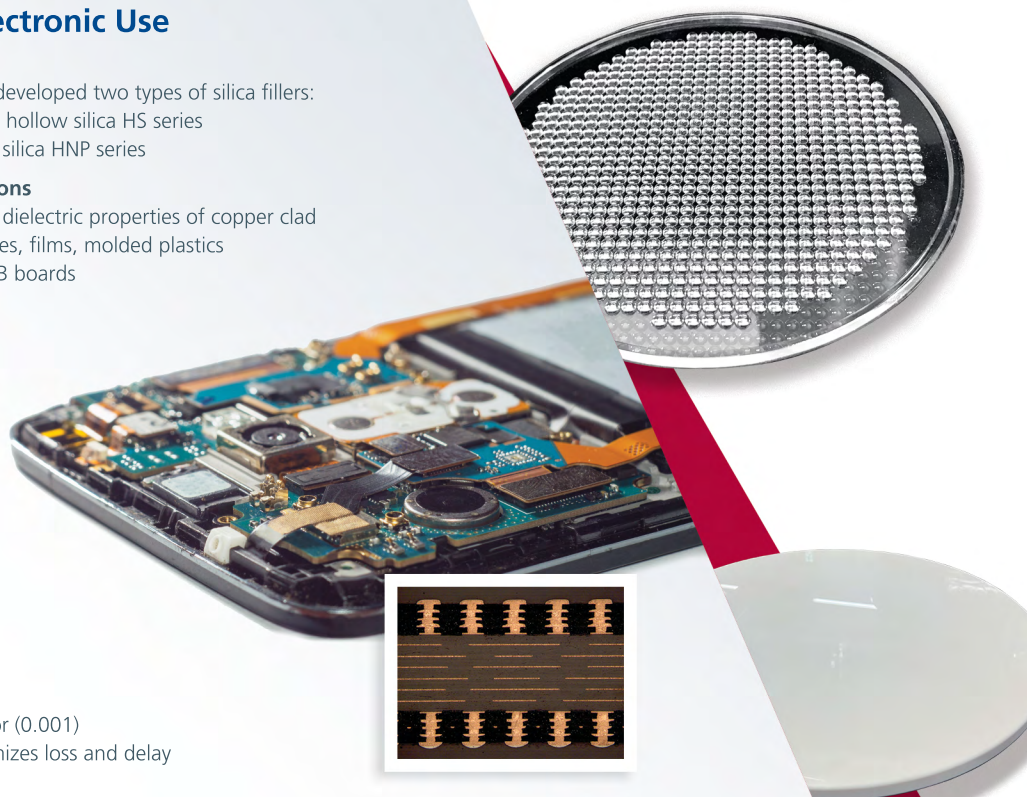
Resin Coated Copper (RCC) for HDI PCB

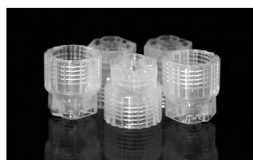
Features

- Extreme low loss ($Df < 0.001$)
- Low CTE for wide temperature range ($CTE_{xyz} < 20 \text{ ppm}/^{\circ}\text{C}$, $50 \sim 260^{\circ}\text{C}$) without glass cloth reinforcement
- Eliminate signal skew

Applications

- HDI PCB (AI accelerator module, switch, NIC, smartphone, etc.)
- CSP/SiP substrate
- Antenna, Antenna-in-Package (AiP)





Fluoropolymer Fluon ETFE, PFA Fluoroelastomer AFLAS FFKM

Features of ETFE, PFA

- High service temperature, injection molded and extruded parts
- Meets SEMI F57 standard

Features of FFKM

- **NEW** Surfactant-free & fluoro solvent-free grades
- High service temperature of > 300 °C
- Excellent plasma resistance
- Peroxide and nitrile-cured options
- Low trace metal content

Applications

- O-rings for chamber seals on CVD and etching equipment
- Tubes and fittings for wafer clean and photoresist
- Coatings of metal parts

High Purity SiC Products

Features

- High purity, high strength material
- High thermal conductivity
- Low thermal expansion
- High heat and chemical resistance

Applications

- Thermal process of semiconductor manufacturing equipment
- LED and solar cells
- Structure material for precision optical equipment

Additional Options

- AGC original CVD coat "CVD-R" for high purity
- "Porous-SiC" for high temperature process



High Flexibility Design SiSiC Products

Features

- Capable of achieving complex designs (e.g., water/gas channels)
- Supports large structures (approx. ~1 m³)

Applications

- Semiconductor manufacturing equipment (e.g. wafer table for lithography system)
- High-stiffness chassis structures for precision equipment

Additional Options

- Design simulation for "high stiffness" and "low cost"



Excellent Plasma-resistant Coating (Y₂O₃/Y₅O₄F₇)

Features

Longer life of parts and reducing particle generation by:

- Excellent plasma-resistant at high temperature (200 °C) with ion-assisted deposition
- Create dense and hard film
- High fluorine gas durability (Y₅O₄F₇)

Applications

- Top plate and side walls of chambers of etching equipment
- Top plate and side walls of chambers of deposition equipment
- Stage and heater components of semiconductor equipment
- Viewing window of semiconductor equipment



Accelerate your innovation—partner with us today.

AGC

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Canton
Singapore
Japan Global HQ

AGC'S Global Footprint in the Semiconductor Industry

Supporting You Anywhere in the World

AGC Chemicals Americas, Inc.

55 E. Uwchlan Ave., Suite 201
Exton, PA 19341
United States of America
Tel: +1 610-423-4300
<https://www.agcchem.com>

AGC Electronics America

4375 NE 59th Ave.
Hillsboro, OR 97124
Tel: +1 503-844-9689
United States of America
<https://agcem.com/>



**Chemistry
for a Blue Planet**
AGC Chemicals

AGC Multi Material America, Inc.

1420 W. 12th Place
Tempe, AZ 85281
United States of America
Tel: +1 480-967-5600
<https://www.agc-multimaterial.com>

AGC Business Development Americas

19200 Stevens Creek Blvd.
Cupertino, CA 95014
United States of America
Tel: +1 408-252-1270
<https://www.agc.com/>

AGC

AGC Chemicals Company AGC Inc.

Shin-Marunouchi Bldg.
1-5-1 Marunouchi
Chiyoda-ku, Tokyo
100-8405 Japan

Telephone: +81-3-3218-5438

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