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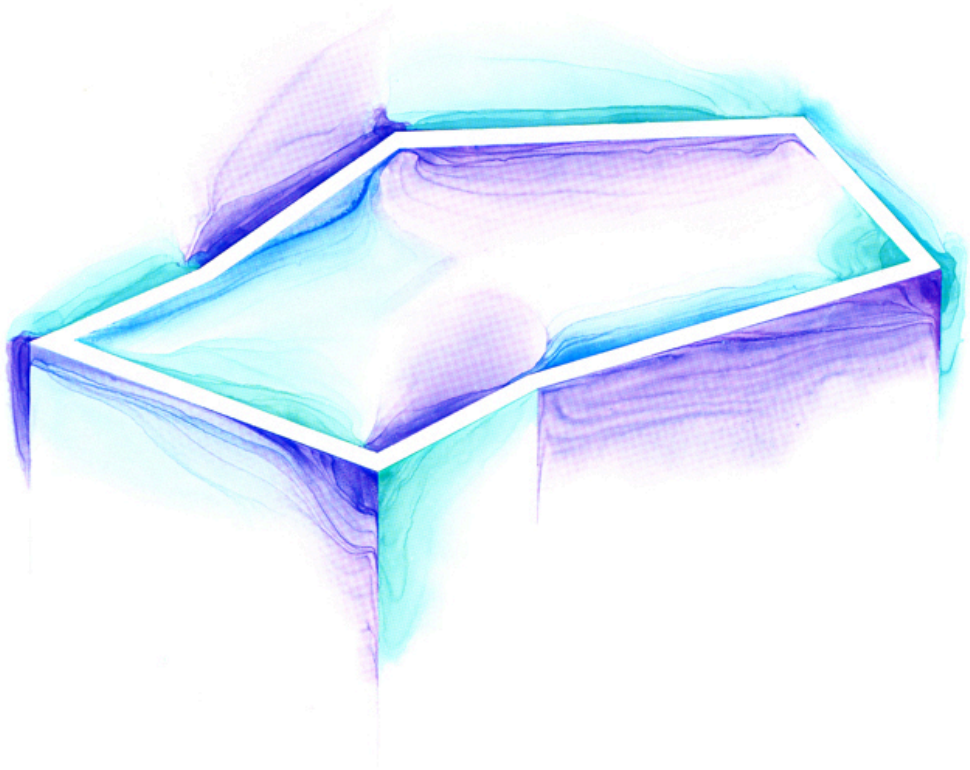
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Applied Materials - Precision 5000 CVD



PRECISION 5000 CVD

A new generation

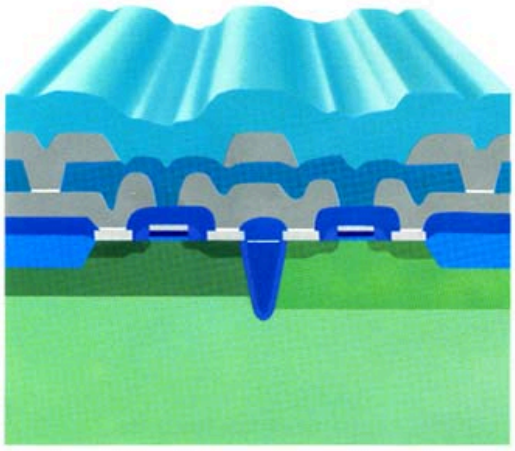
The Applied Materials Precision 5000 CVD offers a single system solution to the complex problems of depositing high quality, low temperature dielectric materials on semiconductor devices. By incorporating multi-step processes, the 5000 provides the enabling technology for void-free intermetal dielectric deposition coupled with profile control. Its process flexibility over a wide range of applications makes it possible to reduce the number and types of machines required for CVD.

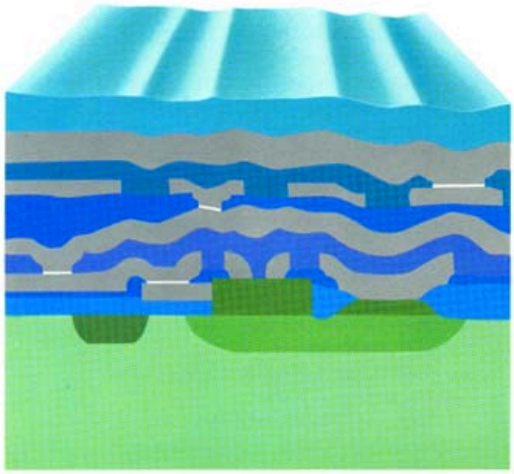
The latest in Applied's new generation of wafer fabrication systems, the Precision 5000 sets stringent new standards for cleanliness, productivity, flexibility and extendability in CVD processing, beyond today's immediate requirements.

Precision 5000 CVD. The single system solution for low temperature dielectrics.



A new generation of dielectric challenges

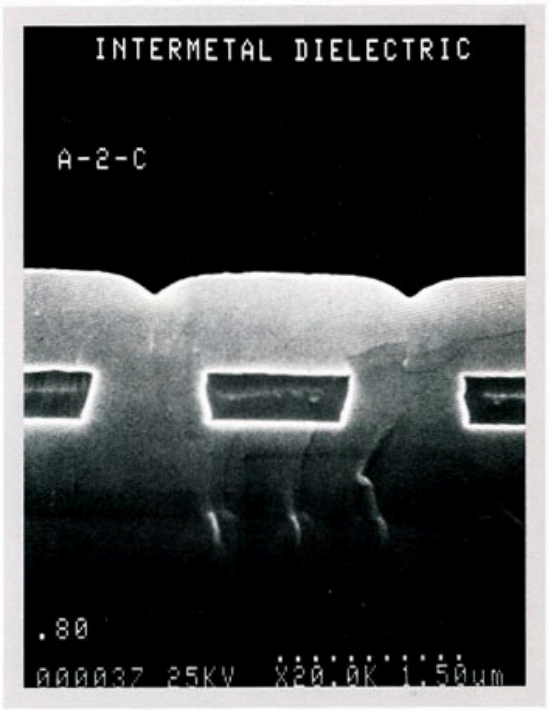




The Precision 5000 CVD was designed to solve the many problems associated with chemical vapor deposition of low temperature dielectrics in both MOS and bipolar devices. Present CVD technologies constitute a major bottleneck in the semiconductor manufacturing process. The challenges are many:

- The large variety of CVD applications makes it difficult to find a single system that addresses all requirements.
- The increasing number of levels of metallization requires the use of highly specialized intermetal dielectrics.
- Achieving void-free deposition and planarization presently requires multi-system approaches which are cumbersome, yield-limiting and expensive.
- Conventional CVD systems are notorious for low utilization, particulate generation and limited factory integration.

A single solution.



Void-free filling of 1μm spaces, leaving a favorable oxide surface topography.

Process Flexibility

Intermetal Dielectrics

Passivation
- Nitride
- Oxide
- Oxynitride
- Combinations

Conformal Depositions
- Sidewall Spacer
- Trench Liner
- Trench Isolation

Doped Oxides
- PSG
- BPSG

Applied Materials' new-generation CVD system, the Precision 5000 CVD, provides a revolutionary solution to the problem of low temperature dielectrics. The flexible, multi-chamber system is capable of handling all of your dielectric needs in a single system that addresses the challenges you now face. Its advantages are many:

Enabling technology.

For intermetal dielectrics, the 5000 incorporates deposition and profile control techniques into a single system without sacrificing film properties or productivity. Void-free filling of submicron spaces is achieved in the Precision 5000 with multi-step processes. In situ smoothing allows control of the topography and profile of the deposited film without removing the wafer from the load locked chamber. Limited wafer handling, coupled with in situ automatic self-cleaning as part of the process cycle, assures a minimal number of particulates.

The 5000 provides the only practical solution to multi-level metallization problems.

Ultimate flexibility.

The modular design of the Precision 5000 CVD provides single wafer processing with easy expandability for either process or throughput, with up to four process chambers. Reliability, particulate control and factory integration are designed into the 5000.

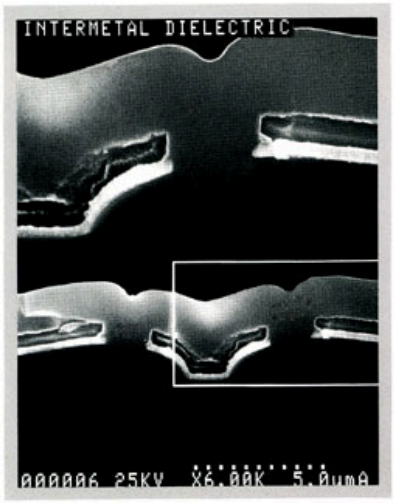
The flexibility of the system design makes it capable of a variety of CVD tasks, including passivation, doped oxides, conformal depositions and others. This kind of flexibility can increase utilization and reduce the number and types of systems required for CVD dielectric deposition, which maximizes your investment in capital equipment.

Superior process results.

Versatility, reliability, particulate control, factory integration and improved capital utilization were all important design goals in development of the Precision 5000 CVD. But one goal came before all others...excellent process results on the wafer.

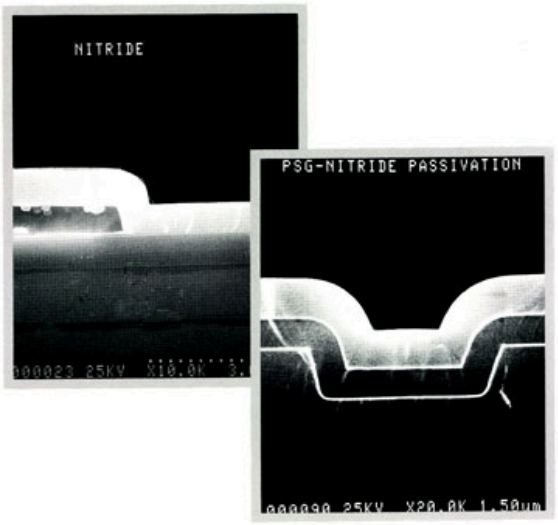
Superior intermetal dielectrics.
In the Precision 5000 CVD, multi-step processes are employed within the same chamber to provide the desired filling of small spaces without voids, and in situ smoothing to control the topography for subsequent metal deposition. The results will set new standards for dielectrics:

- Void-free filling for submicron spaces with controlled surface topography.
- Reduced handling and automatic self-cleaning process result in minimal particulates.
- Excellent mechanical and electrical film properties.
- High throughput in a single system.



Oxide Deposition over Aluminum Contact.

Versatility to meet all CVD requirements.
The design of the Precision 5000 extends beyond the need for improved intermetal dielectrics to encompass other CVD applications, such as passivation, conformal depositions and doped oxides.



Passivation

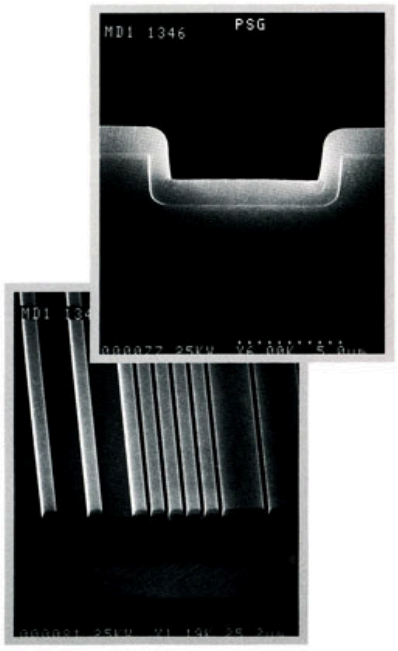
- Choose from a wide range of passivation materials: PSG, Nitride, Oxynitride, or any combination.
- Excellent step coverage, low stress, and low hydrogen content.
- In situ automatic self-cleaning is part of the process cycle.

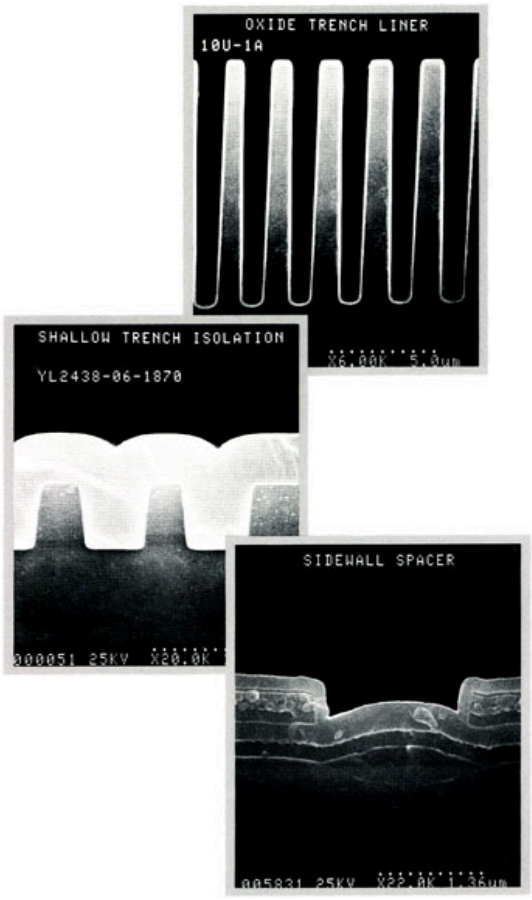
Conformal Oxide Depositions

- Capable of 100% conformality regardless of aspect ratio.
- Perfectly controlled sidewall spacers for lightly doped drain (LDD) structures.
- Partial trench filling for capacitor liners.
- Complete filling for shallow trench isolation.

Doped Oxides

- Improved doping control and uniformity with reduced particulates.
- Excellent step coverage and planarization of small features is possible.
- Small footprint, flush-mounted, automatic system.
- Non-toxic dopant source for safety.





Process integration for the future.

The Precision 5000 CVD represents a major step forward in deposition technology. Its unique design also makes it a major step toward the total process integration which will be an essential element in cost-efficient fab lines of the future.

Today, the 5000 can provide a wide variety of dielectric material for both MOS and bipolar integrated circuits. The extendability of the system will be provided through future process integration in a single system.

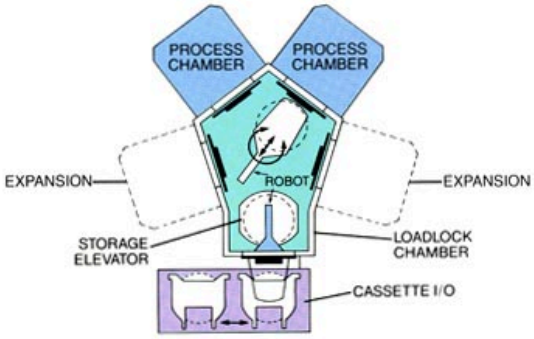
A single system.

The Precision 5000 CVD provides the reliability, flexibility and contamination control needed to produce today's semiconductors. But it was also designed to be extendable well into the future with full fab integration and broad process capabilities.

Modularity leads to flexibility.

The modular design of the Precision 5000 CVD provides single-wafer processing with up to four process chambers. Each chamber is a self-contained individual module with self-aligning, bolt-on capability.

- Independent chambers provide inherent production backup and easy expansion of throughput or process.
- Simplified wafer handling accepts standard plastic cassettes, with no special boats required.
- The system is compatible with all wafer sizes from 100mm to 200mm diameter.





Centrally-positioned robot serves up to 4 chambers with gentle hand-offs and no moving parts over the wafer (load lock cover removed).

Full factory automation.

Factory automation was designed into the Precision 5000 so that it is ready when you are. All operations can be controlled by the host computer in conjunction with an external robotic cassette exchange for hands-off operation, and cleaner, more efficient production.

- SECS I and II interface to a host computer are provided.
- Simple cassette input/output allows reliable robotic cassette exchange.





Simplified operation, sophisticated performance.

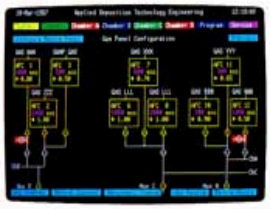
Only four push-button commands are needed to operate the Precision 5000: LOAD/UNLOAD/GO/STOP. The powerful microprocessor allows real time control of up to four process chambers with flexible wafer routing between chambers, if desired.

- All programming is accomplished via light pen CRT or directly from the host computer.
- Full recipe creation, editing and storage are provided, as is real time reporting of process and machine status.
- Individual wafer history is maintained and deviations from standards are reported.
- Built-in automatic calibration and set-up service programs simplify maintenance and troubleshooting.

Designed-in particulate control.

The Precision 5000 CVD was designed to maximize uptime and minimize particulate generation. Self-diagnostic programs and built-in troubleshooting routines, combined with simplified maintenance procedures, ensure reliable performance. Designed-in particulate control provides the cleanest CVD processing available in the industry today.

- A unique gas distribution and pumping scheme confines deposition to the wafer surface and opposite electrode, allowing automatic chamber cleaning as part of the process cycle. Every wafer sees a clean chamber.
- Surface-controlled reaction minimizes process-generated particles.
- Gentle wafer hand-offs and no moving parts over the wafers.
- Load lock protects the process chambers from atmospheric contamination. Slow pump and vent through low turbulence diffusers minimizes airborne particulates.
- Integral ULPA flow hood protects the wafer cassette input/output environment.
- Flush-mount clean room interface reduces floor space and places all maintenance outside the clean room.





A new generation of support



The Precision 5000 CVD is a totally new concept in chemical vapor deposition. But along with the new standards for CVD performance come new requirements for excellence in worldwide, easily accessible field support to ensure maximum system utilization. Around the clock and around the globe, you need a support organization that stands behind the product with the experience and resources to meet and solve your problems. You need a company that is committed to keeping your production systems running no matter where in the world they are located.

A record of excellence.

Applied Materials' first product in 1968 was a CVD system. We've been designing, building and supporting CVD-related products longer than anyone else. We've set new industry standards for semiconductor production systems. And we back them with expert process support on three continents, using state-of-the-art clean room facilities in the United States, England and Japan. Our record for meeting our delivery and service commitments is one of the best in the industry and our performance guarantees are the standards by which others are measured.

With the Precision 5000 CVD, you get a package of support that is unique in the industry. Our confidence in the system reliability is backed by an exclusive one-year full service warranty that includes:

- A one-year warranty on non-consumable parts, backed by our commitment to 24-hour parts shipment for down systems;
- A one-year warranty on labor, backed by our worldwide field engineering organization;
- A full year of Monthly Preventive Maintenance to help avoid potential problems and maintain the system at peak performance.

The same coverage can be provided for the life of the system under a Full Service Agreement.

When spare parts are needed, they are available globally, around the clock, via hot line service. Trained troubleshooting teams are never more than 24 hours away, and complete technical assistance, from comprehensive documentation to training programs, is available when and where you need it.

With the Precision 5000 CVD, you get more than just the strength of an important new leading edge technology —you get the strength of an industry leader ready to stand behind the product. New standards of excellence for a new generation.



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