

THE LEADING THIN FILM COATING SOLUTIONS for medical industries



Picosun is the leading provider of AGILE ALD™ (Atomic Layer Deposition) thin film coating technology for healthcare industries. Picosun's biocompatible ALD coatings enable safer and longer lasting products, more compact sensing and analysis devices, and novel medical applications such as smart ablation catheters and deep brain stimulation probes. Picosun's PicoMEDICAL™ solutions are already in production use in medical industries in e.g. depositing bioactive coatings on surgical implants, and functionalizing the surface of drug particles for controlled drug delivery.

APPLICATION EXAMPLES

Dental & orthopedic implants, surgical fixators

- Improved osseointegration with bioactive anatase TiO₂ thin films
- Biobarriers for encapsulation against metal ion leakage into tissue fluid

Pacemakers and other implantable electronic devices

- Hermetic biobarrier encapsulation of the device electronics against the effect of tissue fluid

Others

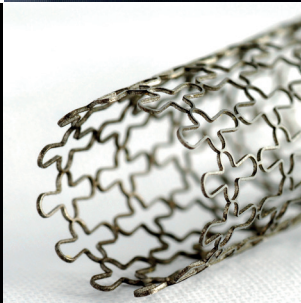
- Medical MEMS, sensors, and Lab-on-a-Chip devices
- Drug delivery systems
- Hydrophobic/hydrophilic coatings
- Functional coatings on powder materials
- Extremely thin films on stents

STRATEGIC PARTNERSHIP for medical industries

Medical industries utilize a variety of coatings for several applications from surface protection and passivation to device manufacturing. Picosun provides industry-leading, production-proven PicoMEDICAL™ ALD solutions for coating of e.g. surgical implants, medical instruments, lab-on-a-chip devices, and stents. These can be processed fast and cost-effectively in large batches in Picosun's production ALD systems. In pharmaceutical industries, Picosun's powder ALD equipment are used for surface modification of particles for controlled drug delivery.



Picosun's comprehensive, turn-key PicoMEDICAL™ solutions enable novel, cutting-edge products and add value to existing ones in form of improved safety, lifetime, and comfort of use.



RELIABLE



ADAPTABLE

EFFICIENT



WE OFFER OUR CUSTOMERS

Standardized and customer-specific ALD solutions

Customers are in the center of all Picosun operations and we have built a wide variety of production-proven, standardized ALD solutions to satisfy our customers' needs. Sometimes, however, customers' requirements vary considerably and no existing ALD equipment or processes are able to meet them. As the agile technology leading company in ALD with pioneering know-how since 1970s, we have just what it takes to develop the optimal technology for our customers' applications. You may not even know how ALD could help you, but let us know the challenges your industry is facing and we will use our in-depth ALD know-how to tailor you a solution – with atomic layer precision!

Consulting services

Our experience ranges back to the birth of the ALD technology itself and our people have worked in production and R&D for years – not only in ALD but in various fields of industry. Picosun's core team has Ph.D. level background in ALD science and they are ready to support you with your application-specific ALD process development, production ramp-up, and integration of ALD into your manufacturing process flow.

Strategic partnership

We at Picosun offer you the most comprehensive after sales services and support, tailored according to the specific needs of your industry. With our Picosupport™ agreements, we minimize the downtime of your ALD equipment, give you support in both technical and process questions, and access to additional services such as local spares storage, periodical maintenance programs, and chemicals delivery. We also offer prepaid service hours and discount for spare parts. As safe and efficient operation of the equipment is a prerequisite for all professional production, our advanced Picotraining™ programs are available for all your ALD system operators, production and R&D supervisors, and maintenance personnel.





P-300B PicoMEDICAL™



P-1000 PicoMEDICAL™

PICOSUN™ ALD EQUIPMENT FOR MEDICAL APPLICATIONS

The PICOSUN™ P-series ALD systems have become the new standard in high volume ALD manufacturing. By integrating our patented hot-wall reaction chamber design with fully separated precursor chemical inlets, we can create the highest quality ALD films with excellent yield, low particle levels, and superior performance. The agile design with easy and fast maintenance ensures minimum system downtime and the lowest cost-of-ownership. Our proprietary Picoflow™ diffusion enhancer technology enables highly conformal coatings on the smallest nanoscale surface details and ultra-high aspect ratio structures with production-proven processes.

The PICOSUN™ P-300B and P-1000 large-scale batch ALD systems are specially designed for coating surgical implants, implantable medical devices, and medical MEMS, sensors, and Lab-on-a-Chip devices.

TECHNICAL FEATURES

PICOSUN™ P-300B

Typical size and type of coated objects

- All kinds of three-dimensions items (metal, glass, plastics, polymers)
- High aspect ratio samples
- Tailored holders for up to thousands of items/run (depending on item size)
- 200 mm wafers in batches of 25 pcs (standard pitch)
- 150 mm wafers in batches of 50 pcs (standard pitch)
- 100 mm wafers in batches of 75 pcs (standard pitch)

Processing temperature

- 50 – 500°C

Typical processes

- Batch processes available with cycle times down to single digit seconds
- Al_2O_3 , SiO_2 , Ta_2O_5 , HfO_2 , ZnO , TiO_2 , ZrO_2 , AlN , TiN , and metals
- Down to <1% 1σ non-uniformity in a batch (Al_2O_3 , WIW, WTW, B_2B , 49 pts, 5mm EE)

Substrate loading

- Manual loading with a pneumatic lift
- Linear semi-automatic loading
- Industrial robot loading

Precursors

- Liquid, solid, gas, ozone
- Level sensors, cleaning and refill service
- Up to 8 sources with 4 separate inlets

PICOSUN P-1000

Typical size and type of coated objects

- All kinds of three-dimensions items (metal, glass, plastics, polymers)
- High aspect ratio samples
- Tailored holders for up to tens of thousands of items/run (depending on item size)

Processing temperature

- 50 – 400°C

Typical processes

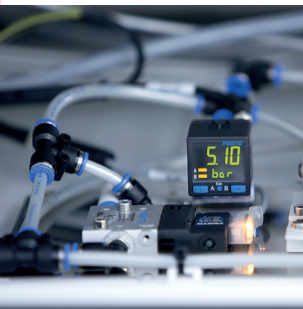
- Al_2O_3 , ZnO , TiO_2

Substrate loading

- Manual loading with loading accessory (e.g. forklift cart)

Precursors

- Liquid, solid, gas, ozone
- Level sensors, cleaning and refill service
- Up to 10 sources with 6 separate inlets



THE PRINCIPLE OF ALD



Introduction of molecules containing element A.



Adsorption of the molecules on the surface.



Introduction of molecules containing element B and reaction with element A on the surface.



Completion of one monolayer of compound AB.

Repeat cycle till desired film thickness is reached.

ALD is the most advanced thin film coating technique of today. This mature, key enabling technology in microelectronics and IC manufacturing for already over a decade is now breaking through all over the industrial field.

ALD's innate ability to form ultra-thin, highly conformal, and pinhole-free coatings with gentle gas phase processing at low temperatures makes it an ideal method for coating medical devices where materials range from sensitive plastics and polymers to metals and delicate electronic components.

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AGILE ALD