

The ALD
Powerhouse



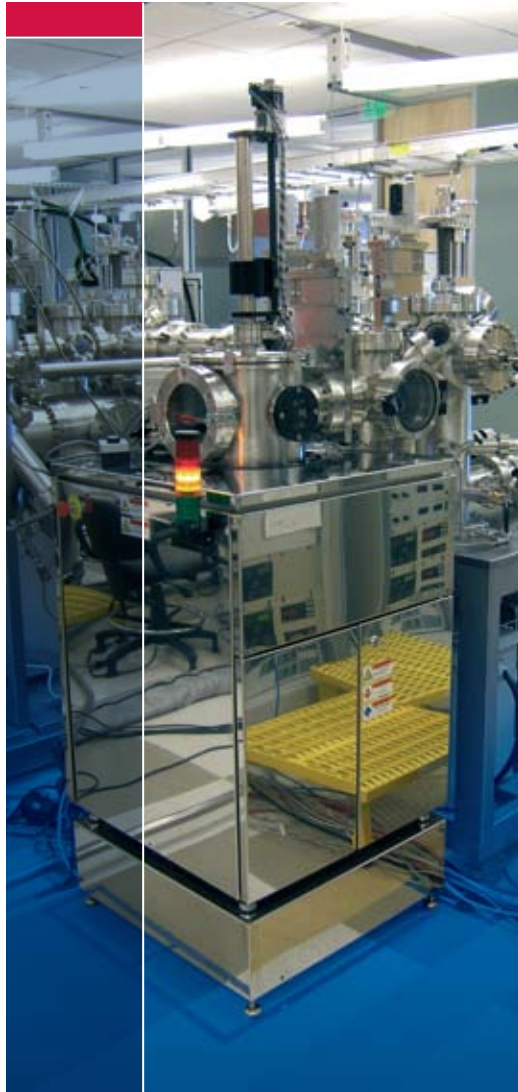
SERIES

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POWERING UP R&D

SUNALE™ R-series ALD systems are designed with pioneering ALD experience to fulfill even the most stringent research requirements. They offer unmatched quality, reliability and productivity. SUNALE™ R-series ALD tools invite corporate funding for research projects because of their unique scalability from research to production.

SUNALE™ R-SERIES ALD Process Tools



SUNALE™ R-150 ALD reactor connected to Omicron UHV cluster at the University of Texas at Dallas

Imagination is the limit

ALD enables processing of a wide range of ultra-conformal and defect free metal oxide, nitride, sulfide, fluoride and pure metal thin films. The films can be used in numerous applications for example in microelectronics, optics and nanotechnology. Imagination is the limit!

Dare to demand the best

High standard R&D requires the best equipment. SUNALE™ R-series ALD tools offer unmatched versatility, speed and quality. These are the systems of choice for the most productive research work.

The ultimate ALD reactor design

Hot-wall top-flow dual-chamber design of SUNALE™ R-series ALD equipment guarantees the deposition of highest quality ALD films with excellent uniformity. We have created highly functional precursor sources for liquid, gaseous and solid chemicals. They enable particle-free processing of a wide range of materials on wafers, 3D objects, powders and all nano-scale features.

The Picosun package

Co-operation with Picosun means a lot more than ALD systems. We provide our customers with world-class ALD process consulting, maintenance solutions and user training. Picosun offers a fantastic opportunity to network with top ALD research units around the globe.

Scalability invites funding

SUNALE™ R-series ALD tools invite corporate funding for research projects because of their unique scalability. R-series results do not fall into the usual technology gap between research and production. Achievements with R-series scale up to production with SUNALE™ P-series.



Examples of ALD applications

Material	Applications
Aluminum oxide, Al ₂ O ₃	MEMS coatings, passivation coating, insulator for microelectronics, ion diffusion barrier, fill layers for magnetic read heads, etch stop layer
Tin dioxide, SnO ₂	Optoelectronics, gas sensors, antistatic coatings, ARC
Titanium dioxide, TiO ₂	Photocatalytic coatings, photovoltaics, antistatic coatings
Vanadium oxides, V ₂ O ₅ and VO ₂	Catalyst coatings, optical switching materials, energy storage
Zinc oxide, ZnO	Semiconductor materials, buffer layers in solar cells, UV blocking layer
Titanium nitride, TiN Tantalum nitride, Ta ₃ N ₅	Metal electrodes, diffusion barriers
Hafnium dioxide, HfO ₂ Zirconium dioxide, ZrO ₂ Tantalum pentoxide, Ta ₂ O ₅ Lanthanum aluminate, LaAlO ₃	High-k dielectrics
Iridium, Ir Platinum, Pt Ruthenium, Ru	Metal electrodes
Ternary materials	E.g. SrTiO₃ as high-k dielectrics
Nanolaminates	E.g. AlTiO as electrical insulator
Doped thin films	E.g. ZnS:Mn for electroluminescent displays
Mixed oxides	E.g. Bi_xTi_yO_z as ferroelectric layer
Graded layers of e.g. two different oxides	To be found

SUNALE™ R-series technical features

Basic features

Wafer size	2-6", 50-150 mm (8" = 200 mm on request)
Process temperature	Up to 500°C
Reaction chamber volume	Small, medium, large
Reaction chamber material	316 SS, Ti, Ni, Al (quartz)
Precursor sources	2-6 liquid / gas / solid
Substrate loader	Pneumatic lift

Measures

Dimensions	27.6 x 41.3 x 36.4", 70 x 105 x 92.5 cm (W x H x D)
Weight	200 kg

Utilities

Power supply	100-240 V, 50/60 Hz, 1- or 3-phase, 3.7 kW
Vacuum pump	30-80 m³/h
Carrier gas	99.999 % N₂ / Ar, min. 2 slm
Compressed air	4-5.5 bar overpressure
Cooling water	Not required for the reactor
Exhausts	For vacuum pump and source cabinets

Sample loader options

Picoloader™ Handyman manual loader with a load lock and a gate valve

Pioneering ALD experience since 1974.



SEMI organisation President and CEO Stanley T. Myers presents the European SEMI 2004 award to Dr. Tuomo Suntola at Semicon Europa 2004 exhibition in Munich.

PICOSUN – THE ALD POWERHOUSE

Picosun is an international equipment manufacturer with a world-wide sales and service organization. We develop and manufacture Atomic Layer Deposition (ALD) reactors for micro- and nanotechnology applications. Picosun provides its customers with user-friendly, reliable and productive ALD process tools, which offer unique scalability from research to production. Picosun is based in Espoo, Finland and has its US headquarters in Detroit. SUNALE™ ALD process tools are used by leading scientific institutions and companies across Europe, America and Asia.

Picosun has expertise that has been attained from over three decades of ALD reactor manufacturing in Finland. Dr. Tuomo Suntola, the inventor of the ALD method in 1974, is a Member of the Picosun Board of Directors. Our CTO Sven Lindfors has continuously designed ALD systems since 1975. Combined, Picosun people share over 200 years of ALD experience and have contributed to more than 100 patents on ALD. Our long history and comprehensive background establishes Picosun as the optimal partner for your ALD technology needs.



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