ANNEALSYS designs and manufactures Rapid Thermal Processing (RTA, RTCVD) Direct Liquid Injection (DLI-CVD, DLI-ALD) systems for research laboratories and companies for semiconductor, MEMS, nanotechnologies, photovoltaic and other applications.
We address the following processes:

- **RTA**: Rapid Thermal Annealing
- **RTCVD**: Rapid Thermal Chemical Vapor Deposition
- **DLI-CVD**: Direct Liquid Injection Chemical Vapor Deposition
- **DLI-ALD**: Direct Liquid Injection Atomic Layer Deposition
More than 240 customers more than 40 countries

Worldwide sales and service support
Research cooperation

SPEED
SPEED (Silicon carbide power electronics technology for energy efficient devices)
INAEL, ABB SCRC, CSIC-CNM, ENEL, Univ. Bremen, Univ. Oviedo, Norstelab, Ascatron, Univ. Nottingham, Infineon Technologies, Infineon Technologies Austria, TU München, Fraunhofer IISb, CVUT Praze, LU Hannover, Ingeteam and Annealsys

DESPATCH
Development of atmospheric plasma Enhanced SPatial ATomiC layer deposition (SALD) for application to silicon Heterojunction solar cells.
LMGP, LTM, GREMI, INES and Annealsys
RTP and RTCVD

Rapid Thermal Processing
Rapid Thermal Chemical Vapor Deposition
RTP Processes

- Implant annealing
- Contact annealing
- Rapid Thermal Oxidation (RTO)
- Rapid Thermal Nitridation (RTN)
- Diffusion of dopants
- Densification and crystallization
- Selenization, sulfurization
- Etc.
RTCVD Processes

CVD of graphene
CVD of hBN
Carbon nanotubes
RTCVD of Si poly, SiO_2, SiN_x
Substrate types

- Silicon wafers
- Compound semiconductor wafers
- GaN/Sapphire wafers for LEDs
- Silicon carbide wafers
- Poly silicon wafers for solar cells
- Glass substrates
- Metals
- Polymers
- Graphite and silicon carbide susceptors
- Etc...
RTP / RTCVD systems

- **AS-Micro**: 3-inch RTP system for R&D
- **AS-One**: 4 and 6-inch RTP systems up to 1450°C
- **AS-Premium**: 156x156 mm² RTP system
- **AS-Master**: 200-mm RTP and RTCVD system
- **Zenith 100**: High temperature RTP / RTCVD system
Main features of Annealsys RTP and RTCVD systems

• Stainless steel cold wall chamber
• Low Temperature measurement system
• Proprietary fast digital PID temperature controller
• Multi zone cross lamp furnace (AS-Premium & AS-Master)
• Vacuum and gas mixing capability
• Same software for all systems
• Optional turbo pump and automatic pressure control
RTP and RTCVD systems
Technology advantages

Cold wall chamber: Less memory effects of the chamber
Better process reproducibility
Higher cooling rates
Accurate temperature measurement (no lamp signal)
No metallic contamination
RTCVD capability

Reactor design: Uniform gas distribution
High vacuum capability

Furnace design: High temperature capability
Multi-zone control (AS-Premium and AS-Master)
AS-Micro
3-inch RTP system for laboratories

Features:
- Infrared halogen tubular lamp furnace with silent fan cooling
- Quartz tube chamber with water-cooled stainless steel flanges
- Room temperature up to 1250°C, up to 250°C/s
- Thermocouple control (optional pyrometer)
- Atmospheric and vacuum process capability
- Purge gas line with needle valve
- Up to 4 process gas lines with digital MFC
- PC control with Ethernet communication for fast data logging
- Optional turbo pump and automatic pressure control
AS-One

Versatile 4 & 6-inch RTP system for R&D and low volume production

Features:

• Floor standing system (reduced foot print)
• Infrared halogen tubular lamp furnace with silent fan cooling
• Stainless steel cold wall chamber technology
• Room temperature up to 1450°C
• Thermocouple and pyrometer control
• Atmospheric and vacuum process capability
• Up to 5 process gas lines with digital MFC, purge gas line
• PC control with Ethernet communication for fast data logging
• Optional turbo pump and automatic pressure control

More than 150 units installed worldwide
AS-Premium

156x156 mm² RTP system
Multiple configurations

Features:
- Heating from top, bottom or both sides
- Stainless steel square cold wall chamber
- Manual loading or cluster interface
- Room temperature up to 1300°C
- Thermocouple and pyrometer control
- Atmospheric and vacuum process capability
- Up to 8 process gas lines with digital MFC
- PC control with Ethernet communication for fast data logging
- Optional turbo pump and automatic pressure control
AS-Master

200-mm RTP and RTCVD system
Up to 1450°C - R&D to production

Features:

• Infrared multi zone lamp furnace with fan cooling
• Stainless steel cold wall chamber technology
• From room temperature to 1450°C, up to 200°C/s
• Thermocouple and pyrometer control
• Atmospheric and vacuum process capability
• Purge gas line and up to 6 process gas lines with digital MFC
• PC control with Ethernet communication for fast data logging
• Optional turbo pump and automatic pressure control
• Manual loading, cassette to cassette and cluster tool versions
AS-Master

RTP system from R&D to production

• Cassette to cassette loading
• Automatic loading of susceptor
• Batch processing capability up to 4”
• Compatible with many substrate types

Manual or multi cassette loading configuration for single wafer or batch wafer annealing with susceptors
Zenith-100

100 mm High Temperature RTP system
Up to 2000°C process capability
RTP and RTCVD processes

Features:

• Low inertia tungsten heating elements
• Stainless steel cold wall chamber technology
• From 400°C up to 2000°C
• Pyrometer temperature control with fast PID controller
• Atmospheric and vacuum process capability
• Purge gas line and up to 8 process gas lines with digital MFC
• PC control with Ethernet communication for fast data logging
• Standard turbo pump and optional pressure control
DLI-CVD & DLI-ALD

Direct Liquid Injection Chemical Vapor Deposition
Direct Liquid Injection Atomic Layer Deposition
DLI-CVD / DLI-ALD Processes

Simple and multi-metallic oxides
Metals, nitrides and alloys
III-V, wide band gap semiconductors
2D and 3D materials
Etc.
Direct liquid injection vaporizers

The machines are provided with Kemstream vaporizer
Perfect vaporizer integration for unique process capabilities

Advantages

- Perfect control of precursor flow (control of the liquid flow)
- Precursor tanks remains at room temperature
- Utilization of thermally unstable chemical precursors
- Utilization of low vapor pressure chemical precursors (solids)
- Utilization of diluted chemical precursors (safer utilization)
- Accurate control of stoichiometry and doping level
- Fast vapor switch on/off
- Coriolis liquid flow meters (no need for calibration)
DLI-CVD / DLI-ALD systems

Technology advantages

• Reactors designed for R&D applications
• Low cost of ownership, low maintenance requirements
• Thermalized walls technology, deposition only on substrate
• No complicated shower heads
• Optimized integration of vaporizers
• Embedded Kemstream direct liquid injection vaporizers
• State of the art liquid panel for easy precursor management
• Reactor by-pass
• Multi process capability: CVD, ALD, pulse pressure CVD...
DLI systems

- **MC050**: 2-inch DLI system with RTP capability
- **MC100**: 4-inch DLI system for R&D
- **MC200**: 200 mm DLI system with plasma capability
MC-050

Laboratory 2-inch DLI system
Multi-process capability:
DLI-CVD, DLI-ALD, MOCVD, RTP, RTCVD

Features:
- Lamp furnace for process up to 1100°C
- Thermocouple control with PID temperature controller
- Up to 6 direct liquid injection vaporizers
- Automatic downstream pressure control
- Process chamber vapor by-pass
- Up to 6 process gas lines with digital MFC and purge line
- PC control with Ethernet communication
- Optional glove box and turbo pump
MC-100

100 mm (4-inch) DLI reactor for R&D
DLI-CVD, DLI-ALD, Pulse Pressure CVD

Features:
- Stainless steel thermally controlled chamber
- Rotating and heating substrate holder up to 800°C
- Substrate holder with vertical motion
- Up to 4 direct liquid injection vaporizers
- Process chamber vapor by-pass
- Thermocouple control with PID controllers
- Vacuum and pressure control
- Up to 6 process gas lines with digital MFC and purge line
- PC control with Ethernet communication
MC-200

200 mm DLI reactor
DLI-CVD, DLI-ALD, Pulse Pressure CVD

Features:
• Stainless steel thermally controlled chamber
• Rotating and heating substrate holder up to 800°C
• Optional capacitive plasma
• Substrate holder with vertical motion
• Up to 4 direct liquid injection vaporizers
• Process chamber vapor by-pass
• Vacuum and pressure control
• Up to 8 process gas lines with digital MFC
• PC control with Ethernet communication
• Optional motorized loadlock
Customer support

• Outstanding customer support
• Fast response time
• Remote (email and phone) rapid thermal process support
• Remote chemistry and process support included with DLI systems
• Efficient technical support thanks to software diagnostic features
Thank you for your attention

139 rue des Walkyries
34000 MONTPELLIER
FRANCE

Tel: +33 (0) 467 20 23 63
Email: sales@annealsys.com

www.annealsys.com