• Rapid Thermal Processing (RTP)
• Rapid Thermal Chemical Vapor Deposition (RTCVD)
• Low Pressure Chemical Vapor Deposition (LPCVD)
• Metal Oxide Chemical Vapor Deposition (MOCVD)
Company overview

Founded in May 2004
Franck Laporte, President
Jean-Claude Duchayne, Managing Director

Team with 25 years expertise in the design and manufacturing of equipment for RTP and CVD

The company is privately owned

Location: Montpellier - France
Systems in the fields

<table>
<thead>
<tr>
<th>Year</th>
<th>Systems</th>
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RTP Processes

• Implant annealing
• Contact annealing
• Rapid Thermal Oxidation (RTO)
• Rapid Thermal Nitridation (RTN)
• Diffusion of spin-on dopants
• Densification and crystallization
• Glass reflow
• Silicidation
• Etc.
LPCVD & RTCVD Processes

• LPCVD: Poly Si, SiO$_2$, Silicon Nitride
• RTCVD: Poly Si, SiO$_2$, Silicon Nitride
MOCVD Processes

Metals and alloys, oxides and transition metal nitrides

- Semiconductor: SiO$_2$, HfO$_2$, Ta$_2$O$_5$, Cu, TiN, TaN, …
- High k Dielectric: SrTiO$_3$, BaTiO$_3$, Ba$_{(1-x)}$Sr$_x$TiO$_3$ (BST)
- Ferroelectric: SBT, SBTN, PLZT, PZT
- Superconductor: YBCO, Bi-2223, Bi-2212, Tl-1223, …
- Piezoelectric: (Pb, Sr)(Zr,Ti)O$_3$, Modified Lead Titanate
- Colossal Magneto Resistance
- Thermal coatings
- Buffer layers
- Mechanical coatings
- Optics
- Etc…
Substrate types

- Silicon wafers
- Compound semiconductor wafers
- GaN/Sapphire wafers for LEDs
- Silicon carbide wafers
- Poly silicon wafers for solar cells
- Glass substrates
- Metals
- Graphite and silicon carbide susceptors
- Etc…
Products

- **AS-Micro**: 3-inch RTP system for R&D
- **AS-One**: 4 and 6-inch low cost RTP tool
- **AS-Master**: 200-mm RTP and RTCVD tool
- **SprayCVD-050**: 2-inch Spray CVD tool
- **MC050**: 2-inch MOCVD tool with RTP capability
- **MC100**: 4-inch MOCVD tool for R&D
- **LC100**: 4-inch LPCVD furnace
Main features of Annealsys RTP and RTCVD systems

- Stainless steel cold wall chamber
- Low Temperature measurement system
- Fast digital PID temperature controller
- Multi zone cross lamp furnace (AS-Master)
- Gas mixing capability
- Same software for all systems
- Optional turbo pump and pressure control
AS-Micro

3-inch Rapid Thermal Processing system for research and development applications

Features:
- Infrared halogen tubular lamp furnace with silent fan cooling
- Quartz tube chamber with water-cooled stainless steel flanges
- Fast digital PID temperature controller
- Thermocouple control
- Atmospheric and vacuum process capability
- Purge gas line with needle valve
- Up to 3 process gas lines with digital MFC
- PC control with Ethernet communication for fast data logging
- Optional turbo pump and pressure control

Applications:
- RTP, RTA, RTO, RTN
- Contact annealing
- Etc …
AS-One

4 and 6-inch low cost RTP tool for R&D and low volume production

Features:
- Floor standing tool (reduced foot print)
- Infrared halogen tubular lamp furnace with silent fan cooling
- Stainless steel cold wall chamber technology
- Fast digital PID temperature controller
- Thermocouple and pyrometer control
- Atmospheric and vacuum process capability
- Purge gas line with needle valve
- Up to 5 process gas lines with digital MFC
- PC control with Ethernet communication for fast data logging
- Optional turbo pump and pressure control

Applications:
- RTP, RTA, RTO, RTN
- Contact annealing
- Etc …
AS-Master

200-mm RTP and RTCVD tool
Up to 1400°C process capability
R&D to production

Features:
- Infrared multi zone lamp furnace with fan cooling
- Stainless steel cold wall chamber technology
- Fast digital PID temperature controller
- 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 pressure control
- Manual loading and cassette to cassette versions

Applications:
- RTP, RTA, RTO, RTN
- Contact annealing
- RTCVD
- Etc …
AS-Master

RTP tool for production of LEDs

- InGaN annealing
- Contact alloying
- Sapphire, GaAs, InP
- 3x4” and 6” capability
- Automatic loading of susceptor

Extended pyrometer control range: 150°C to 1400°C
Full automation for multi substrate loading
Edge pyrometer for enhanced temperature control of compound semiconductors and sapphire substrates processing with susceptor.
SprayCVD-050

Laboratory 2-inch system for new process development
Spray CVD and RTP in the same reactor

Features:
• Lamp furnace for process up to 1200°C
• Thermocouple control with PID temperature controller
• Kemstream Atokit for atomization of precursor
• Purge gas line with needle valve
• PC control with Ethernet communication

Applications:
• TCO: SnO₂, ZnO, TiO₂, …
• In₂O₃, Nb₂O₅, YBCO, WO₃, ….
MC-050

Laboratory 2-inch MOCVD system

Multi-process capability in the same reactor: MOCVD, Spray CVD, RTP & RTCVD

Features:
- Lamp furnace for process up to 1200°C
- Thermocouple control with PID temperature controller
- Up to 4 precursors or precursor mixtures
- Downstream pressure control
- Purge gas line with needle valve
- Up to 6 process gas lines with digital MFC
- PC control with Ethernet communication

Applications:
- Metal and alloys, …
- Oxides, …. 
- Transition metal nitrides
- Etc …
MC-100

Low cost 4-inch MOCVD reactor for R&D
Metals and alloys, oxides and transition metal nitrides

Features:
• Stainless steel thermally controlled chamber
• Rotating and heating substrate holder up to 850°C
• Substrate holder with vertical motion
• Up to 4 precursors or precursor mixtures
• Vaporizer reactor by-pass
• Thermocouple control with PID controllers
• Vacuum and pressure control
• Purge gas line with needle valve
• Up to 6 process gas lines with digital MFC
• PC control with Ethernet communication

Applications:
• Metal and alloys, …
• Oxides, ….
• Transition metal nitrides
• Etc …
4-inch LPCVD furnace
Poly silicon, SiO$_2$ and Silicon Nitride

Features:
- Tubular 3-zone furnace
- Digital PID temperature controllers
- Atmospheric and vacuum process capability
- Up to 50 wafers per batch
- Purge gas line, up to 8 process gas lines with digital MFC
- PC control with Ethernet communication
- Optional turbo pump

Applications:
- Silicon deposition
- Silicon nitride
- Silicon oxide
- Etc …
Control software

- Windows XP compatible
- Same software for all systems
- Ethernet communication with furnace
- 3 access levels
- Diagnostic capabilities
- Traceability option
- Automatic upgrade procedure
Quality control

- Full quality control of systems
- AS-One is SEMI-S2 compliant
Research cooperation

Annealsys is involved in Research projects with laboratories and industrial companies

Crisilal
Silicon recrystallisation for PV applications
CEA-DRT-LITEN, ULP-InESS, Imphy Alloys, Photowatt, Annealsys

Eloge 3D
Optimized electrolyte for 3D architecture (batteries)
CEA-DRT-LITEN, LMGP, Laboratoire Laplace, ST Microelectronics, Biophy Research, Annealsys
Worldwide support

Worldwide sales and service support