# GEMSTAR-A™ Benchtop Vacuum Anneal System

ARRADIANCE

Molecular Innovation™

*The GEMSTAR-A benchtop Anneal system is designed for uniform, high temperature annealing of various size substrates in a vacuum controlled, user selectable, gas environment.*

*A small, rugged, lightweight machine for heavyweight R&D efforts, GEMStar makes optimal use of lab space and research budgets.*

ARRADIANCE® GEMStar Anneal system, built off the same platform as GEMStar ALD systems, allows annealing up to 500°C temperature in a vacuum environment with inert gas flow. The Annealing system is the latest in the GEMStar line of high quality, high value process tools with features that rival much larger and more expensive systems.

The uniformity of thin films can determine whether a process or device works or not. The GemStar Annealing furnace is designed to provide the user with the most uniform films, even with the most challenging materials.

Some key features of the system include:

- The chamber accommodates up to 200mm diameter wafers or 200mm square plates or 3-dimensional objects up to 50mm in height.
- Customizable end effector allows simple and repeatable loading/unloading of substrates.
- The chamber is controlled up to 500°C with a heated door controlled up to 300°C. Substrate thermal control to ± 1.0%.
- Distributed gas delivery insures uniform gas distribution over the entire substrate
- System pressure monitoring
- All metal seal gas handling
- MFC controlled user selectable gas input
- CF 2.75 flange reactor interface for easy attachment of in-situ metrology options such as QCM.

## Process Control

Precise films require state-of-the-art controls. The Arradiance GEMFlow™ Control System maintains complete control over key deposition parameters such as temperature, gas flow rate, pressure, substrate position and orientation, and time.

- User created/saved process recipes allows substrate to substrate and batch to batch consistency without sacrificing flexibility
- Diagnostic system logging allows creation of traceable data of all system parameters during all process runs
- Dell Vostro 3700 Laptop with Genuine Windows® 7 Professional 64-Bit
- Internal GEMStar USB control module

## Easy Maintenance

Simplified tool maintenance results from the use of a modular system design with benchtop access to all critical components.

- The modular system design allows easy swapping out of parts for service and cleaning, with minimal down time.
- Convenient benchtop access from the top and back to critical parts, precursor bottles, vacuum, power and gas connections.
- Exhaust gases are flowed through a thermal decomposition trap prior to the vacuum pump.

# GEMSTAR-A™ Benchtop Vacuum Anneal System

| GEMSTAR-A Specifications | |
|---|---|
| Substrate Size | Up to 200mm Square<br>Up to 50mm Thick 3-D solids<br>Standard retained 200mm Ø end effector |
| System Dimensions (w x d x h) | 32” x 25” x 12” (82cm x 64cm x 31cm) – fits on standard desktop or lab bench |
| System Weight | 150 lbs |
| Reactor surface area/volume | Approximately 250 $in^2$ / 130 $in^3$ (1610 $cm^2$ / 2130 $cm^3$) |
| Reactor Thermal Control | 1800W reactor zone with up to 500°C ± 1°C<br>300W door zone with up to 300°C ± 1°C<br><15 minutes from room temperature to 175°C |
| Carrier/Vent Gas Control | Script settable high speed mass flow controller (MFC) 0-200 SCCM calibrated |
| Control System | GEMFlow™ software suite, Windows® 7 based, advanced and basic GUIs<br>Import/export of Excel compatible recipes and data<br>Internal GEMStar USB control module |
| Shell/Cabinet | Tool removable top panel with rear facilities interface<br>CF 2.75 Metrology/Custom Chamber Interface |
| **Facilities Requirements** | |
| N2/Purge Gas | 20 ± 5 psi High purity $N_2$ (>99.999%); $N_2$ purifier recommended |
| Air | 80 ± 5 psi regulated clean dry air |
| AC Power | IEC Appliance Input<br>IEC C19 20 amp AC Plug/Connector<br>Voltage: 110-120 vac. 50/60 Hertz<br>Current: 20 Amps |
| Vacuum Port | Recommended 2-stage, rotary vane vacuum pump; >12 cfm pump capacity<br>NWKF 25 sized foreline |