

### Standard Configuration

- CVDWinPrC™ based process control software for Real Time Process Control, Data Logging and Display, Recipe Generation and Editing
- Preprogrammed Recipes for SW/ MW CNT's, Nanowires, Annealing, Diffusion, Oxides, Nitrides, ALD, Epitaxial layers, Graphene, etc.
- 3 Zone Resistance Furnace for Temperatures up to 1100 °C
- Wafer Sizes up to 50mm
- High Throughput with FastCool™ Furnace
- Proprietary Real-Time Cascade Process Temperature Control
- Atmospheric Process Operation
- Cantilevered Automatic Substrate Loading/Unloading System
- 3" Quartz Reaction Chamber
- 4 Mass Flow Controlled UHP Gas Lines
- User Settable Warnings and Alarms
- Application Customized Safety Systems
- Comprehensive Software and Hardware Safety Interlocks
- One (1) Year Warranty
- SEMI - S2/S8 and CE Certified

First Nano's EasyTube® 2000 System is an advanced turnkey thermal catalytic chemical vapor deposition process tool for the synthesis of a wide variety of nanostructured materials. The system is optimized for controlled process development and user safety.

Our systems are now being used for process development and/or materials growth across many industries including nanoelectronics, semiconductor, photovoltaic, NEMS/MEMS, composite, structural coatings, etc.

Our modular platform houses key process components and multiple advanced options to meet your specific process requirements. Options are field upgradable.

Operated through our CVDWinPrC™ process control software, it automatically logs data and graphically shows the time dependent values of user selected parameters. CVDWinPrC™ also allows users to load preprogrammed recipes, modify, check /create new recipes and view real time or saved execution data.



FastCool™ Furnace



Designed to meet today's more stringent safety standards, the system can safely process most pyrophoric and toxic chemicals including silane, germane, diborane, phosphine, HCl, and metal organic precursors. The system also has application customized safety protocols imbedded into relay logic, PLC and CVDWinPrC™ software.

The EasyTube® 2000 offers high throughput. The HotLoad™ option (see image on page 2) enables fast heating and cooling by transferring samples between a cold loadlock chamber to a hot process chamber. The fast heating process shows improved SWCNT and Graphene quality. The FastCool™ resistance furnace automatically opens at multiple steps during the cooling stage to reduce the cooling time from more than 3 hours to less than 1 hour. With the HotLoad™ and/or the FastCool™ control, a typical CNT process can be finished within 1 hour.

## R&D Turn-Key Equipment / Process Solutions

### Options

- Multi-zone Furnace with Proprietary Real-Time Cascade Process Temperature Control
- Resistance Heating High Temperature Furnace > 1200 °C
- Infrared (IR) Heating for Rapid Thermal Processing (RTP) > 1100 °C
- Run/Vent: stabilizes gas flows (bypassing the Process Tube) before flowing into Process Tube
- Low Pressure Operation (100 mtorr – 700 torr), < 50 mtorr Base Pressure
- Solid Source Vapor Delivery Kit for Oxide and Nitride Nanowire Growth
- Liquid Precursor Vapor Delivery Kit
- Bubbler Liquid Auto Refill
- Rectangular Process Tube for Improved Laminar Gas Flow
- HotLoad™ Transfer System
- DC Bias Field Assisted Growth
- Up to an Additional 4 Mass Flow Controlled UHP Gas Lines
- Air to Water Heat Exchanger for Cooling Water
- Residual Gas Analyzer
- **EasyGas™** Hazardous Gas Cabinets
- **EasyPanel™** Gas Panels for Argon, Nitrogen, Helium, Oxygen
- **EasyExhaust™** Gas Conditioning System



Hot Loader™ Transfer System

### Gas Cabinets

### Process Equipment

### Gas Abatement



First Nano offers turn-key system capabilities with support equipment such as Gas Cabinets and Exhaust Gas Conditioning Systems. All major components from one vendor makes interfacing easy. The First Nano **EasyGas™** gas cabinet is capable of delivering a variety of toxic and hazardous gases. The **EasyExhaust™** System will thermally pyrolyze and wet scrub the process effluents.

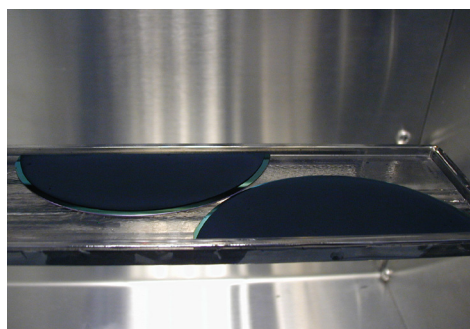
Our field proven system performance and solid customer base establishes First Nano as the clear choice in leading edge nanotechnology development equipment for the advanced research facility.

Call us at (631) 981-7081 to discuss a product solution for your project. We can also be reached at [sales@firstnano.com](mailto:sales@firstnano.com) or visit our website at <http://www.firstnano.com>

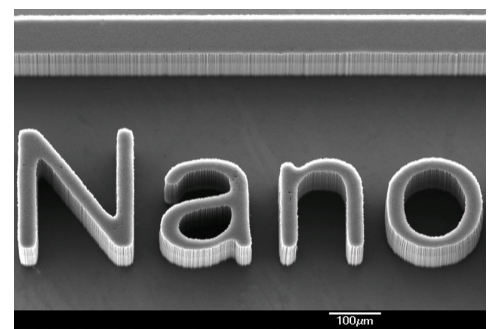
### FACILITY REQUIREMENTS

Electrical	208 V.A.C	3 Phase	30 AMP
Dimension	64" L	30" W	60" H
Exhaust	300 CFM		
Cooling Water	1 GPM	50 PSIG	
Pneumatic Supply	Clean Air or N2	80 PSIG	
Facility Nitrogen	25 SLPM	10 PSIG	
Process Gases	Ar, H2, CH4, C2H4 or Customer specified		

\* Note: Electrical varies with country; facility requirements vary with system options. Consult Factory for details.



CNT film on a 3" wafer cut in half



Vertically aligned CNT array

First Nano, a division of CVD Equipment Corporation

1860 Smithtown Ave. | Ronkonkoma, NY 11779 | Tel 631.981.7081 | Fax 631.981.7095 | [www.firstnano.com](http://www.firstnano.com) | [www.cvdequipment.com](http://www.cvdequipment.com)

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