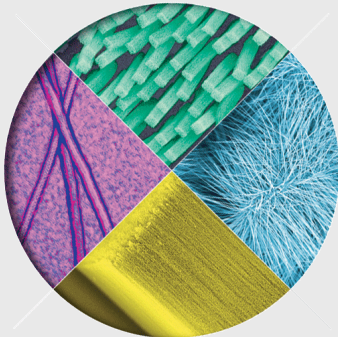


EasyTube® 3000

Thermal Chemical Vapor Deposition Process Tool



Standard Configuration

- CVDWinPrC™ based process control software for Real Time Process Control, Data Logging and Display, Recipe Generation and Editing
- Preprogrammed Recipes for a wide variety of applications
- 3 Zone Resistance Furnace for Temperatures up to 1100 °C
- Wafer Sizes up to 100mm
- High Throughput with FastCool™ Furnace
- Proprietary Real-Time Cascade Process Temperature Control
- Cantilevered Automatic Substrate Loading/Unloading System
- 5" 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® 3000 System is the most advanced customizable chemical vapor deposition/annealing process tool for nanomaterials synthesis, thin film depositions and anneals. The EasyTube® 3000 is capable of synthesizing a myriad of nanostructures and thin films including SW/MWCNT's, Graphene, nanowires such as SiGE, Ge, ZnO, GaN, BN, and thin films such as Si, SiO₂ and Si₃N₄ using selected combinations of hydrides, liquids and/or solid precursors. The system can also be customized for Annealing, Selenization and/or Sulfurization applications.

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.



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 loadlock chamber option further enhances chemical safety, prevents process chamber contamination from air and minimizes substrate contamination. The system also has application customized safety protocols imbedded into relay logic, PLC and CVDWinPrC™ software.

The EasyTube® 3000 offers high throughput. The HotLoad™ option 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 FastCool™ control, a typical CNT process can be finished within 1 hour.

R&D Turn-Key Equipment / Process Solutions

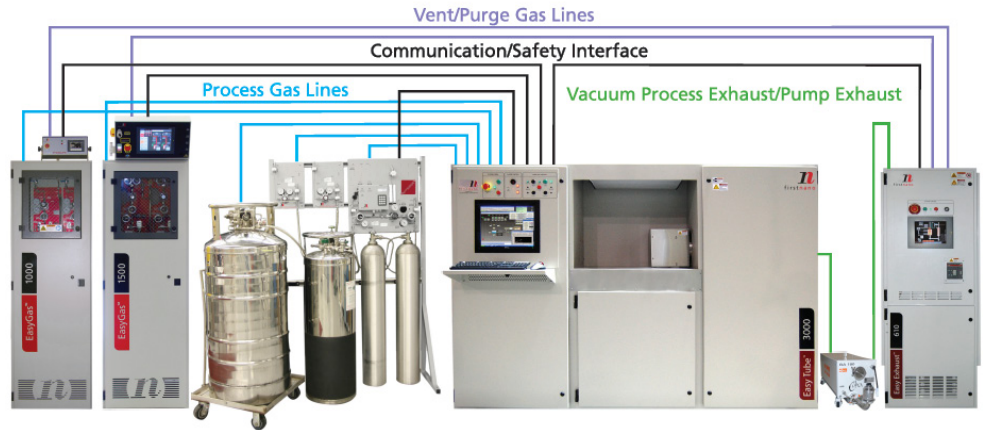
Options

- 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
- Induction (RF) Heating for Process Temperatures >1500 °C
- Low Pressure Operation (100 mtorr – 700 torr), < 50 mtorr Base Pressure
- Ultra High Vacuum (UHV) for Process Chamber and/or Loadlock Chamber
- Loadlock for High Throughput and Additional System Safety
- HotLoad™ transfer system
- Glove Box with exhausted or N₂ purge
- Liquid Precursor Vapor Delivery Kit
- Bubbler Liquid Auto Refill
- Solid Source Vapor Delivery Kit for Oxide and Nitride Nanowire Growth
- Rolling Furnace
- Rectangular Process Tubes for Improved Laminar Gas Flow
- Upstream Plasma (ET3000EXT)
- DC Bias Field Assisted Growth
- Wafer size up to 150mm
- Wafer Rotation to Improve Growth Uniformity
- Up to 12 Mass Flow Controlled UHP Gas Lines
- Air to Water Heat Exchanger for Cooling Water
- Residual Gas Analyzer
- EasyGas™ Hazardous Gas Cabinets
- EasyPanel™ UHP Gas Panels for Argon, Nitrogen, Helium, Oxygen
- EasyExhaust™ Gas Conditioning 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.

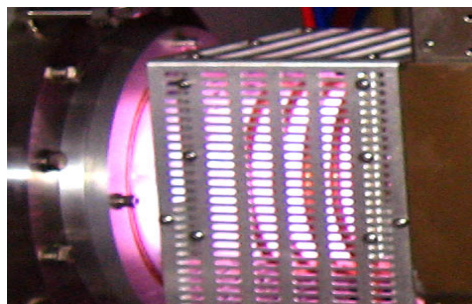
Our field proven system performance and solid customer base establishes First Nano as the clear choice in leading edge nanotechnology development equipment for the advanced research facility.

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

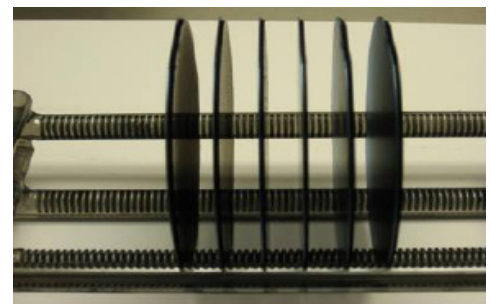
FACILITIES REQUIREMENTS

Electrical	208 V.A.C	3 Phase	40 – 60 AMP
Dimension	96"/119" L	33" W	70" H
(120" L with options such as RF Plasma, 7" tube, rolling furnace, etc.)			
Exhaust	500 CFM		
Cooling Water	2 GPM	50-75 PSIG	
Pneumatic Supply	Clean Air or N ₂	80 PSIG	
Facility Nitrogen	20 SLPM	20 PSIG	
Process Gases	Customer specified		

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



Remote RF Plasma



CNT Batch Synthesis

First Nano, a division of CVD Equipment Corporation

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