

CVD-BTT5

Thermal CVD for CNT Synthesis

Technical Data Sheet



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Purpose:

A furnace type of thermal CVD system with a catalyst-precursor providing function is designed for researchers to synthesize various forms of carbon nanotubes (vertically-aligned, long-length, and powdery CNTs).

Features:

- Ethanol liquid can be used as carbon source, as well as hydrocarbon gas; good effect for SWCNT synthesis.
- Catalyst-precursor providing function is equipped; Long-length (~500 μm) vertically-aligned CNT films and powdery CNT can be synthesized.
- 3 lines of precise mass-flow gas controllers are equipped.
- Compact size, steady chassis.

This is a carbon nanotube CVD synthesis system which uses a horizontal quartz tube furnace (diameter = 50 mm). This system is suitable for stably producing vertically-aligned CNT on substrates and powder CNT in large quantity. This system produces almost the same type of CNT as the mini CVD system MPCNT-Premium, but it reproduces CNT products at more stable qualities and quantities. It is also capable of growing CNT on the outer surface and inside of samples with complicated three-dimensional shapes.

The system is equipped with a catalyst-precursor providing mechanism, by which the catalyst precursors can be introduced easily: just placing catalyst precursors on the special holder on the upstream side of the quartz tube, where the catalyst precursors are sublimed by the residual heat of the quartz tube and flowed by the injected gas.

The ethanol injection unit is equipped with a titration-based flow control system. The gas introduction unit is equipped with 3 lines of mass flow gas controllers (inert gas, hydrocarbon gas, and hydrogen gas). The process that Microphase recommends is capable of producing CNT with a combination of acetylene gas and a catalyst precursor.

The vacuum exhaust system enables this system to operate at a wide range of gas pressure from atmosphere to low pressure (10 Pa), and also to be usable as a thermal treatment system such as a vacuum furnace, atmosphere furnace, and nitriding furnace besides a system to produce CNT.

Tubular Furnace

Operating temperature	400 – 1000 C
Control of temperature	1 zone program control
Dimensions	W300 mm x H200 mm x D186 mm
Electric Capacitance	700 W

Furnace Tube

Material	Quartz
Dimensions	OD50 mm x ID46 mm x L900 mm

Other specifications

Control of gases	Mass flow controller
Introduced gases	Carrier gas: N ₂ or Ar Reducing gas: H ₂ Hydrocarbon gas: C ₂ H ₂ or C ₂ H ₄ or CH ₄
Vacuum gauge	Bourdon gauge
Vacuum pump	Oil sailed rotary vacuum pump Dimesnion: W156 mm x H200 mm x D300 mm

Feed mechanism for Liquid Fuel

Feed mechanism for catalyst precursor

Dimensions W1100 mm x H1000 m x D500 mm