



NL50 Benchtop Nanoparticle Deposition System



Catalysis



Graphene



Life Sciences & Nanomedicine



Photonics



Sensors



Nanoparticles at the push of a button



NL50 Features

The compact benchtop design and simple touch screen operation of the NL50 makes the system ideally suited for any laboratory studying the applications of nanoparticles.

The vacuum deposition process produces **ultra pure** nanoparticles that are **free of hydrocarbons** or other contamination, which typically plague chemical techniques. The nanoparticle coating is deposited straight onto your substrate and after a typical **cycle time of 30 minutes** is ready for analysis; no further drying or purification steps required.

One touch nanoparticle deposition

Hydrocarbon free, non-agglomerated nanoparticles.

Sub-monolayer or high porosity 3-D nanocoating.

Cycle time less than 30 minutes.

Surface plasma clean and functionalisation.

Wide choice of materials including **Ag, Au, Cu, Ir** and **Pt**.

Repeatable process.

Easy to use, compact design



The intuitive user interface is easy to use and allows full automation of the pump down and deposition sequence.

- Fully automated pump down and venting.
- Preloaded optimised deposition settings for common materials.
- Advanced users can control deposition conditions to vary the nanoparticle size and deposition rate.
- Choice of deposition control using deposited weight or deposition time.



Designed for
the researcher
investigating the properties
of nanoparticles

Overview

Ultra pure nanoparticles

The NL50 utilises magnetron sputtering to generate a beam of ultra pure nanoparticles from solid source material, in vacuum. No chemicals or surfactants are used.

Nanoparticle characteristics are:

- Ultra pure and hydrocarbon free.
- Non-agglomerated.
- Consistent and repeatable results.
- Wide choice of materials.
- Generate compound nanoparticles such as nitrides and oxides.

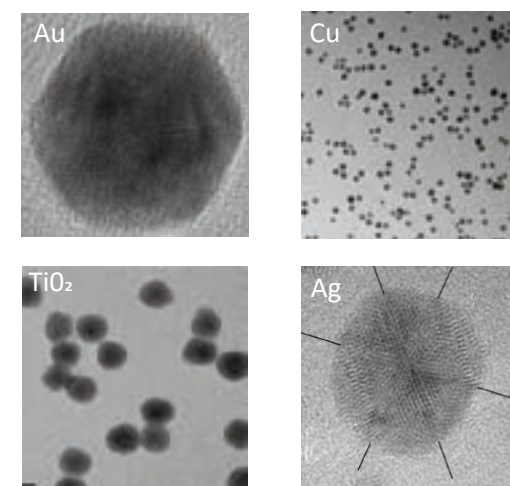


Fig.1. TEM images of nanoparticles generated in the NL50.

Elements which have been explored with NL50:

Ag, Al, Au, C, Cd, Co, Cu, Cr, Fe, Ge, Hf, Ir, Mg, Mo, Nb, Ni, Pd, Pt, Rh, Ru, Sc, Si, Sn, Ta, Ti, V, W, Y, Zn, Zr

Deposition control

Real time deposition control using a Quartz Crystal microbalance (QCM) enables precise and repeatable control over surface loading from sub monolayer coverage to porous 3D structures. Deposition times are typically a few minutes. Deposition rates range from 10-50ng/cm²s.

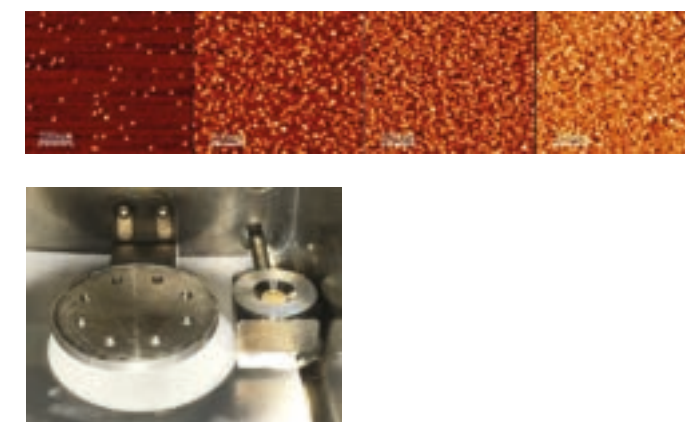


Fig.2. and Fig.3. Show repeatable nanoparticle loading control (top), using quartz crystal microbalance (bottom).

Applications plus many more...

Catalysis

Fuel Cells.
Photocatalysis.
Electrochemistry.
Water/Air purification



Graphene

Electronics.
Energy.
Composites.
Sensors.



Life Sciences & Nanomedicine

Cancer therapies.
Drug delivery.
Antimicrobial.
Antiviral.
Biofilms.



Photonics

Photovoltaics.
Light harvesting.
Surface enhanced.
Raman.



Sensors

Biosensors.
Optical.
Electrical.
Electrochemical.



Ultra Pure Nanoparticles

Quick material exchange

NL50 is the ideal multi-user tool. Switch from one material to another in minutes. The flip back lid design ensures target exchange in minutes using only a Philips screwdriver. The 180° flip back lid allows full access to the sputter target without needing to remove the magnetron head.

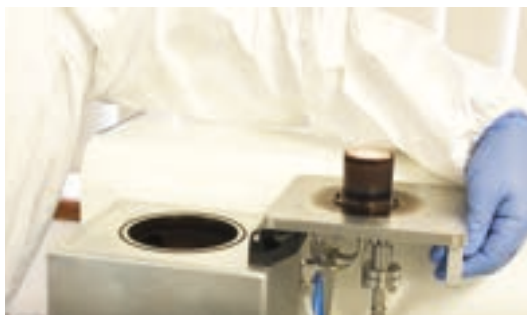


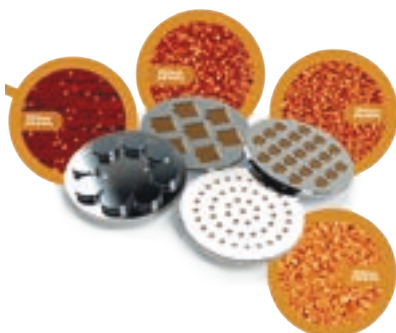
Fig.4. Shows 180° flip back lid for full sputter target access.

Flexible substrate loading

The NL50 is designed for a wide range of substrate types and sizes up to 50mm in diameter. Even delicate substrates are suitable as no heat is generated in the deposition chamber.

Substrates include, but are not limited to:

- Microscope slides.
- Petri dishes.
- Micro-well plates.
- Electrodes.
- Membranes.
- Plastics.



Surface cleaning and pre-treatment

The NL50 offers optional in-situ plasma cleaning of conducting substrates. In vacuum plasma cleaning removes adsorbed molecules from the substrate, in order to aid adhesion of the deposited nanoparticles and enable functionalisation of the substrate surface before deposition. For delicate substrates simply deselect the plasma cleaning step in the recipe.

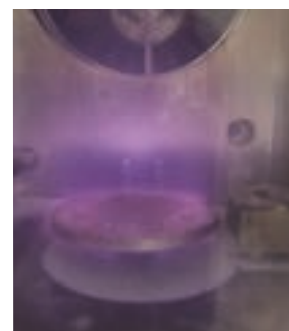
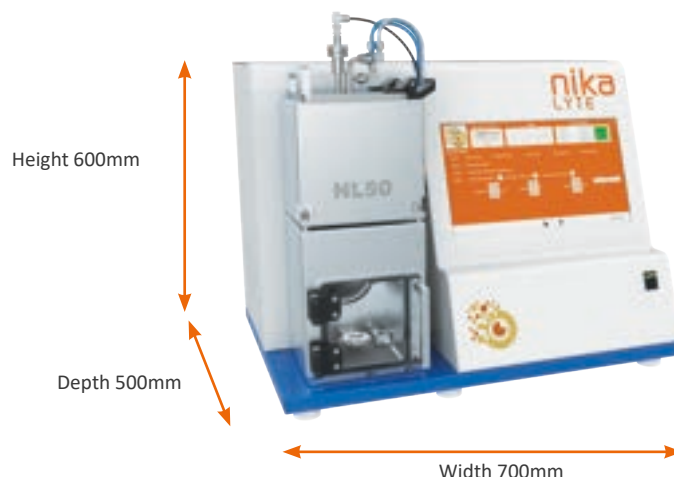


Fig.5. Substrate plasma cleaning.

Specifications

NL50 weight: approx. 60Kg (133lbs)

NL50 dimensions: (L x W x H) 700 x 500 x 600mm
(27.6 x 19.7 x 23.6 inches)



Consumables

Target size	1 inch (25.4mm) diameter, max 3mm thick
Maximum sample size	50mm diameter
Materials	Conducting materials, including Ag, Au, Pt, Cu, Ni, Ti, Ir

Utilities

Power	Single phase IEC, AC@110-260V, 50-60Hz
Gas	Argon (process gas) Nitrogen (vent gas) High pressure air (pneumatics) 6mm compression fittings
Water	1L/min (0.3 US GPM) 2x10mm compression fittings
Pumping	DN25KF, 120L/m(7.2m³/hr) backing pump required (provided as optional extra)

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