



# NL50

## BENCHTOP NANOPARTICLE DEPOSITION SYSTEM



### Recommended Applications

- ◇ Photonics
- ◇ Antiviral
- ◇ Catalysis
- ◇ Life Science
- ◇ Graphene
- ◇ Sensors
- ◇ Antibacterial
- ◇ Drug delivery
- ..and many more

### 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 Au, Pt, Ag, Cu and Ir

*The NL50 is designed for the researcher investigating the properties of nanoparticles.*



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## NL50 compact design



### Flip back magnetron lid

..quick material exchange

### Nanoparticle generation zone

..ultra pure nanoparticles formed in vacuum

### Sample Chamber

..easy sample loading  
..view deposition through clear loading door

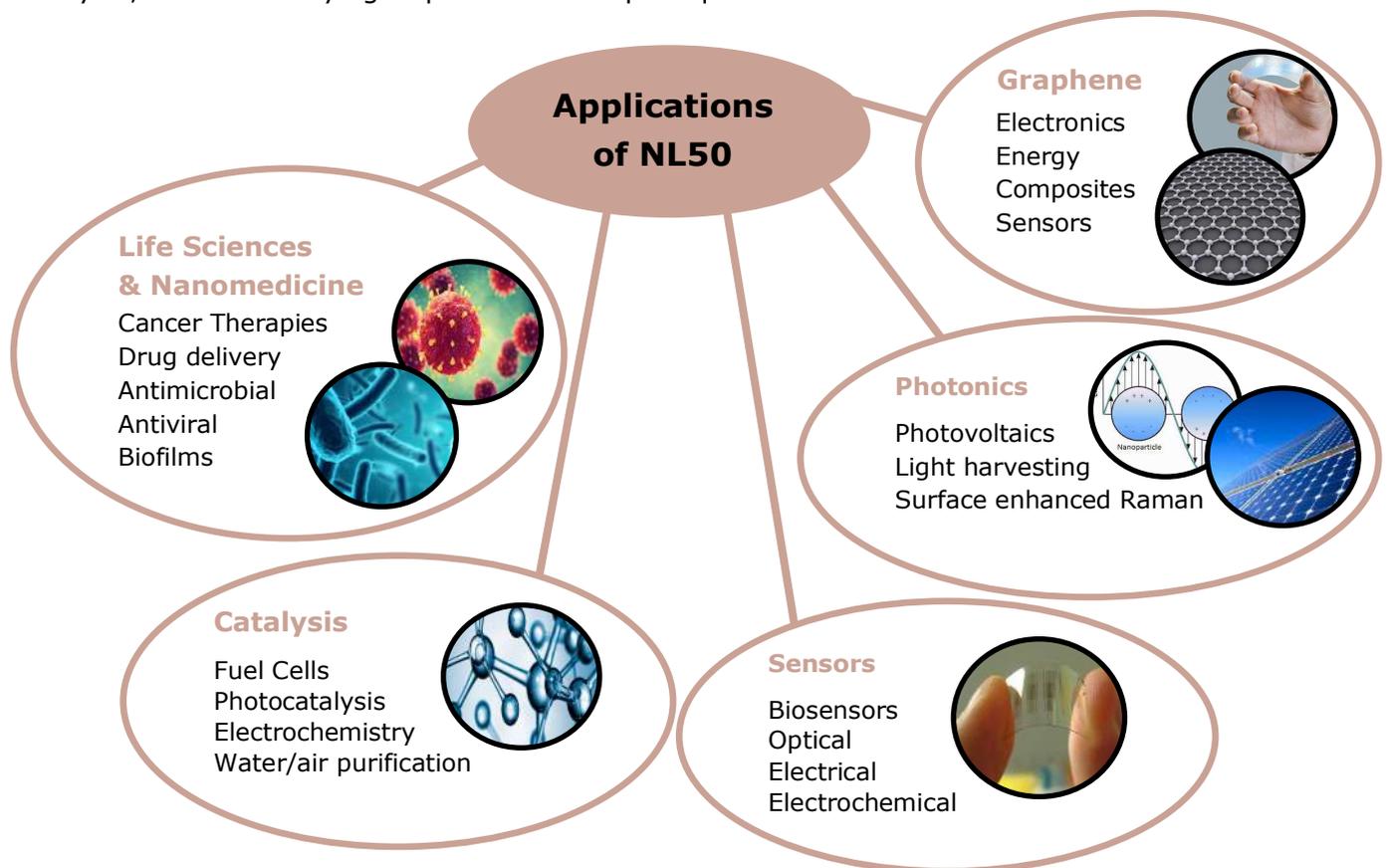
### Touch Screen

..fully automated recipe control  
..preloaded settings for common materials

## NL50 is at home in any research laboratory

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 the after a typical **cycle time of 30minutes** is ready for analysis; no further drying or purification steps required.



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## Ultra Pure Nanoparticles

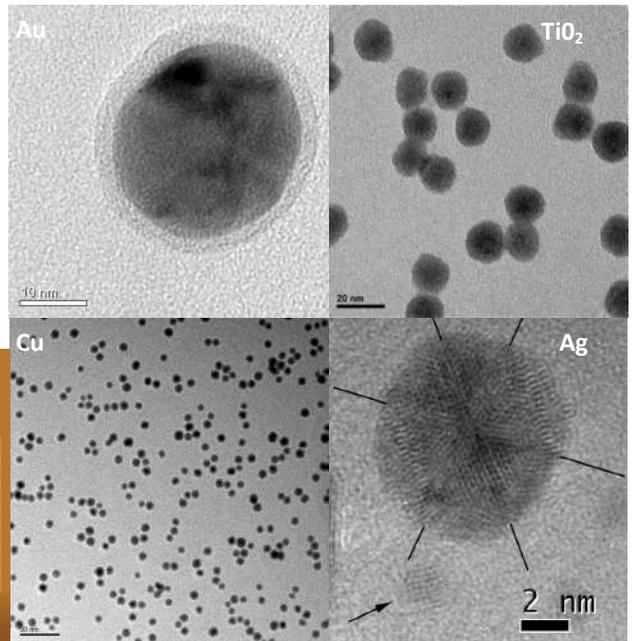
The NL50 utilises magnetron sputtering to generate a beam of ultra pure nanoparticles in vacuum.

Nanoparticle characteristics are:

- ✘ Ultra pure and hydrocarbon free
- ✘ Non-agglomerated
- ✘ Consistent and repeatable results
- ✘ Choice of materials including **Au, Ag, Cu, Pt, Ir, Ni, Ti, and Zr**
- ✘ Generate compound nanoparticles such as nitrides and oxides

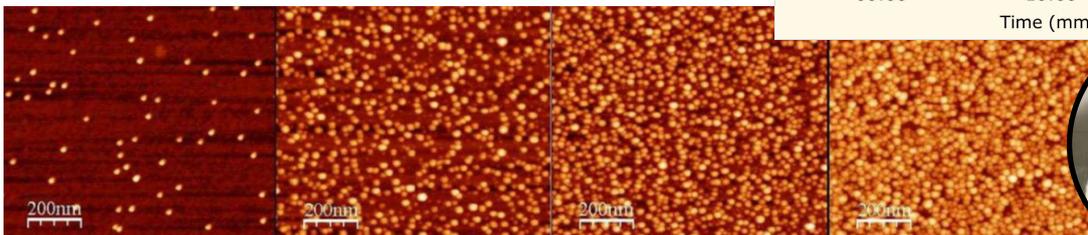
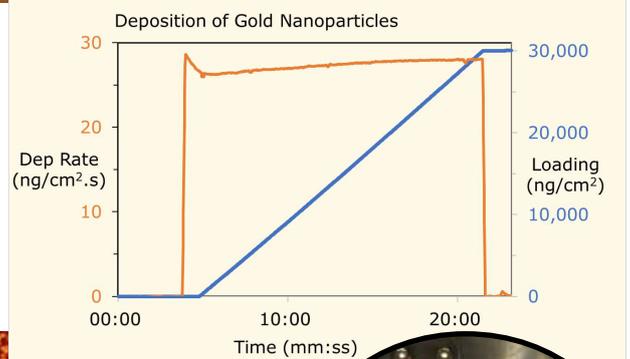
NL50 MATERIALS TABLE  
The highlighted areas show elements which have been explored with the NL50:

Periodic Table of the Elements



## Deposition Control

**Real time deposition control** using a Quartz Crystal Monitor (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/cm<sup>2</sup>s



## Easy to Use

**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.

**Chamber Pressure**  
> 1.00E+3 mb  
Standby Mode  
Ready

**QCM**  
Rate: 0.0 ng/(cm<sup>2</sup>.s) Silver  
Total Mass: -5 ng/cm<sup>2</sup> Set to Zero  
Crystal Life: 99 % Z-value: 0.525

**System Status**  
 ✓ Door Closed  
 ✓ HVPSU OK  
 ✓ TMP OK  
 ✓ Vac. System OK  
 ✓ QCM OK  
 ✓ No Commis Errors  
 ✓ Chamber Venting  
 ✓ Coolant Flow OK  
 ✓ HVPSU Interlock  
 ✓ TMP Interlock  
 ✓ High Vacuum  
 ✓ QCM Crystal Life  
 ✓ Chamber Venting  
 DIFIBER VENTED

**Quick Start Wizard**

STEP 1: Systems check ✓ Coolant Flow OK ✓ Door Closed ✓ System Active ✓ QCM Crystal OK

STEP 2: Silver target selected

STEP 3: No plasma cleaning selected

STEP 4: Deposit nanoparticles?  and a) stop at a set mass  or b) stop after a set time?

Mass to deposit: 500 ng  
Current: 150 mA  
Argon: 40 sccm

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## Quick material exchange

NL50 is the ideal **multi-user tool**. Switch from one material to another in minutes.

The flip back design ensures target exchange in minutes using only a Philips screwdriver. The 180deg flip back lid allows full access to the sputter target without needing to remove the magnetron head.



## 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.

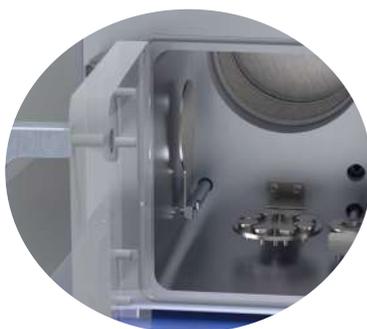
For delicate substrates simply deselect the plasma cleaning step in the recipe.



## 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



## SPECIFICATIONS

**NL50 Weight:** approx. 60Kg (113lbs)

**NL50 Dimensions:** (LXWXH) 70x50x60cm  
(27.6x19.7x23.6inches)



## Consumables

<b>Target size</b>	1inch (25.4mm) diameter, max 3mm thick
<b>Max Sample Size</b>	50mm diameter
<b>Materials</b>	Conducting materials, including Ag, Au, Pt, Cu, Ni, Ti, Ir

## Utilities

<b>Power</b>	Single phase IEC, AC@110-260v, 50-60Hz
<b>Gas</b>	Argon (process gas) Nitrogen (vent gas) High pressure air (pneumatics) 6mm compression fittings
<b>Water</b>	1L/min (0.3 US GPM) 2x10mm compression fittings
<b>Pumping</b>	DN25KF, 120L/m(7.2m <sup>3</sup> /h) backing pump required (provided as optional extra)



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