

Benchtop Nanoparticle Deposition System from Nikalyte

Nanoparticles offer huge opportunities in a staggeringly wide range of technological and medical applications. But in order to realize these applications, researchers require extremely sophisticated tools to produce, handle, and study them. The NL50 is Nikalyte's flagship nanoparticle deposition system, designed to provide labs of all sizes with the ability to easily produce and deposit high-quality nanoparticles for research applications.

The importance of nanoparticle deposition

The unique properties of nanoparticles have opened up a huge range of potential applications, ranging from low-tech implementations (such as the reinforcement of car tires using carbon black) to sophisticated ones like targeted drug delivery, biosensing, and the development of next-generation solar cells.^[1] The field of nanoparticle research is busier than ever, with researchers working to unlock and develop applications across life sciences, medicine, catalysis, optics, sensing and photovoltaics.^{[2],[3]}

Nanoparticle deposition systems play a crucial role in this, not only by enabling rapid synthesis of nanoparticles, but by depositing them in a controlled manner onto surfaces so that they can be studied. While the synthesis of nanoparticles has always been a major component of nanoparticle research; nanoparticle researchers now benefit from the use of commercial nanoparticle deposition systems like [Nikalyte's NL50](#) to rapidly produce nanoparticles at the touch of a button.^[4]

Much of what makes nanoparticles interesting is down to their high surface-area-to-volume ratio, which causes surface effects to dominate over bulk effects. However, these effects can also make them difficult to work with. The dominance of surface effects makes nanoparticles "sticky": they tend to stabilize themselves either by sorption of molecules from their surroundings, or by agglomerating with each other. These tendencies mean that the development of effective nanoparticle deposition systems has been far from straightforward.

Agglomeration and contamination of nanoparticles are especially prevalent in nanoparticle deposition systems that rely on chemical techniques to produce or deposit nanoparticles. In these cases, nanoparticles generally suffer from a high level of contamination from hydrocarbons and other compounds. In addition, some nanoparticle deposition systems that use nanoparticles in a liquid phase (such as dip coating and spin coating) provide poor control over packing density and film thickness.

Benchtop nanoparticle deposition systems from Nikalyte

Nikalyte's NL50 nanoparticle deposition system overcomes these problems using vacuum deposition. By producing and depositing nanoparticles via magnetron sputtering in a hard vacuum, our benchtop nanoparticle deposition system can produce ultra-pure nanoparticles which are free of hydrocarbons and other contaminants.

At Nikalyte, we understand the value of removing the hassle from nanoparticle deposition and enabling researchers to focus on gathering data. For this reason, we developed the NL50 nanoparticle deposition system to provide industry-leading performance as well as being intuitive and easy to use. Touchscreen operation makes our nanoparticle deposition system as easy as possible, requiring just minutes of training for routine use.

Source material can be changed in under 5 minutes, while a typical cycle time of 30 minutes (without additional drying or purification steps) means that our nanoparticle deposition system is a fast and reliable source of nanoparticles suitable for any laboratory. The NL50 also offers in-situ plasma cleaning of conducting substrates, eliminating the additional cleaning steps required with other nanoparticle deposition systems.

The NL50 features real-time deposition control using a quartz crystal monitor, enabling the nanoparticle deposition system to achieve precise surface loading from sub-monolayer to porous 3D structures. The NL50 nanoparticle deposition system offers Deposition times of just a few minutes, and deposition Rates range of 10-50ng/cm².

If your lab requires a fast, simple-to-use [nanoparticle deposition system](#) capable of producing ultra-high purity nanoparticles, look no further than the NL50. Get in touch with us today to find out more.

References

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3. Hakim, L. F., et al. (2007). Nanoparticle coating for advanced optical, mechanical and rheological properties. *Advanced Functional Materials*, 17, 3175–3181.
4. Nikalyte. (n.d.). *Direct nanoparticle deposition system | Loading control | NL50*. <https://www.nikalyte.com/nl50/>