DIFFUSION
DEPOSITION

5 nm

FILTRATION
DEPOSITION

100 nm

IMPACTION
DEPOSITION

200 nm

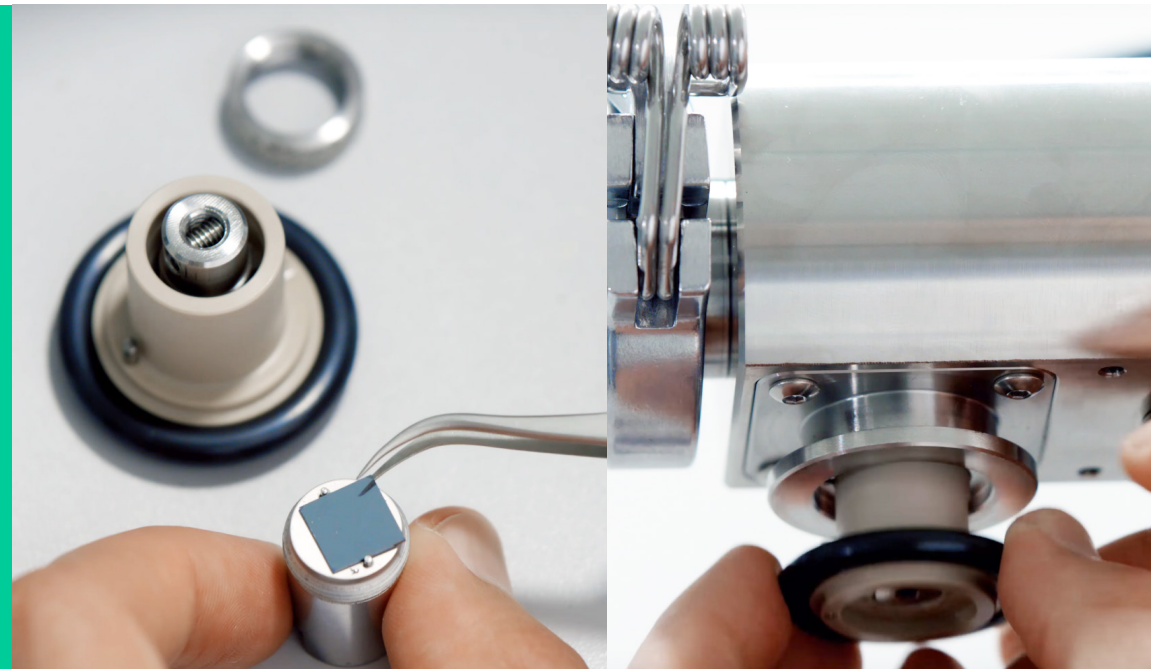# VSP-G1 & deposition accessories
Sample preparation at the push of a button

Reproducible nanoparticle sample preparation for 0–20 nm pure (metal, metal oxide, alloy) particles of any (semi-) conductive material.

vsparticle

Fast, reproducible sample preparation

The VSP-G1 is a table-top, user-friendly nanoparticle generator that can be combined with three deposition accessories. Combining these technologies will enable researchers to easily produce nanoparticle samples in a matter of hours, with typical preration times within 60 minutes. The complete setup is controlled via Go from hypothetical to novel matierals in the same day!

0–20 nm pure particles at the push of a button

Research applications including but not limited to: fundamental spectroscopy studies, model catalyst research, photocatalysis, electrocatalysis, fuel cells, batteries, carbon nanotube growth, materials science, emissions testing, filter testing, semiconductors.
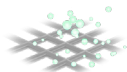
Switch your substrate in a matter of minutes
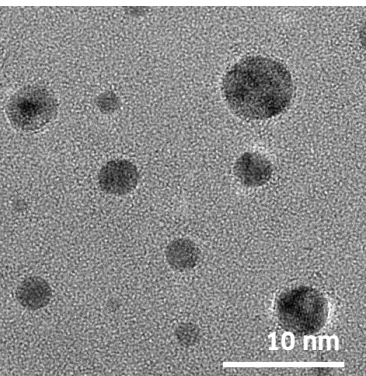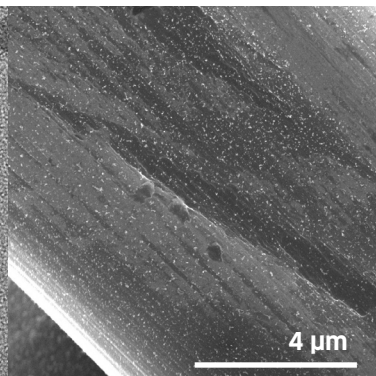
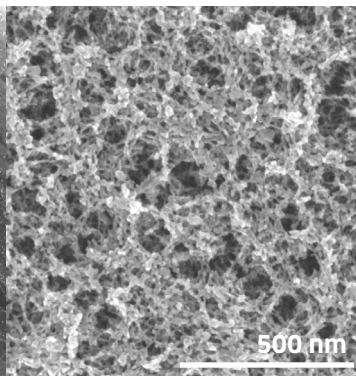## Deposition results

Diffusion　**Filtration**　**Impaction**

TEM Analysis of Co nanoparticles on copper-carbon grid, generated with the VSP-G1 and deposited with the diffusion accessory (A1)
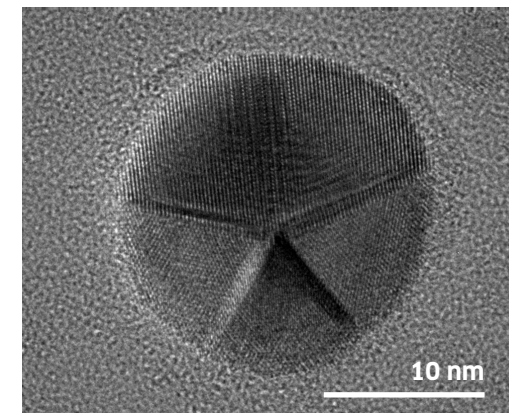
SEM analysis of Ni nanoparticles generated with the VSP-G1 and deposited on carbon fibers with the filtration accessory (A2).

SEM analysis of porous layer of CuO nanoparticles generated with the VSP-G1 and deposited with the impaction accessory (A3).

Compatible with all semi-conductive materials (alloy, non-alloy)

With VSP products any (semi-) conductive material can be processed into nanoparticles of 0–20 nm, including metals, metal oxides, alloys, carbon and semiconductors. The particles are deposited directly on the desired substrate, such as (in-situ) TEM substrates, electrodes, Si chips, filters. The outcome is a sample covered with nanoparticles and ready for analysis!

HR-TEM analysis of alloyed Ag-Cu nanoparticles generated with the VSP-G1 and deposited with the diffusion accessory (A1).

Unique features of the VSP-G1

At the push of a button

- Particle size from single atom up to 20 nm
- Tunable size distribution
- Only inputs needed are power, electrodes and carrier gas
- Sample prepation time <1 hour

Material versatility

- Any (semi-)conductive material: pure, alloys, mixed, oxides and other combinations
- Mix (immiscible) materials at the nanoscale with 2 target electrodes (e.g. Au & Al)
- Pure, model nanoparticles: No surfactants or precursors

Unique features of the Deposition Accessories

Diffusion deposition VSP-A1

- Well-dispersed, unagglomerated particles
- Sample ready in 1–10 minutes
- From concept to novel materials in less than 1 hour
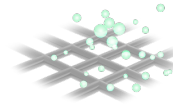
Filtration deposition VSP-A2

- Bottom-up (electro)catalyst fabrication
- Mix & match oxides and metallic nanoparticles
- Unsupported nanoparticle collection using in-line filter

Impaction deposition VSP-A3

- Grow a nanoporous oxide layer
- Useful as catalyst support/sensitive material

Operating Window

Target electrode material	metals, metal oxides, alloys, semiconductors, carbon
Particle size	1–20 nm
Max deposited area	VSP-A1: 10×10 mm, VSP-A2: ø47 mm, VSP-A3: ø3 mm
Substrate types	e.g. (in-situ) TEM chips , electrodes, (doped) Si chips
Production rate	1–10 mg per hour
Total sample prep. time	30-60 minutes
Carrier gas	Ar, N_2, Ar + O_2, Ar + H_2

Technical Specifications VSP-G1

Power	110–240 V AC
Dimensions	Casing ca. 52×45×20 cm
Weight	ca. 15 kg
Digital output	RS232
Controller	VSP-C1 (included)
Room temperature	
Standard pressure	

Nanoparticles at the push of a button.

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The reactorhead is fully modular to enable the safe and easy switching of electrodes. Change electrodes within 10 minutes to repeat the same experiment with a different starting material.

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