



Materials for a
Bright and efficient future



About Us

Avantama AG

is the worldwide leader in the development and production of nanomaterials for electronics. Avantama's material innovations enable the fabrication of high quality optical and electronic coatings by established printing and coating techniques. Avantama's unique technology and know-how allows fast proof-of-concepts, focused product developments and thus speeds up the overall time-to-market. Avantama's production capacity is at the multi-ton-scale and its high production standards qualify for the electronic industry. Avantama is your preferred partner for tomorrow's innovations.

Offices near Zurich

Our modern facilities are located 30 minutes outside of the city of Zurich at the shores of lake Zurich. Our R&D laboratory and production site are equipped with state-of-the-art machinery, processing tools and analytical instruments allowing a precise and reliable production of commercial materials.

Capabilities

Avantama's expertise lies in the development and production of coating solutions based on inorganic nanoparticles. We have unique problem solving skills making us the preferred partner to create material innovations for cost and material efficient production. We have customers and partners from a wide range of industrial fields, of which many are leaders in their field.

Our patent portfolio currently includes more than 15 patent families focussed on optoelectronic applications, mainly for displays, OLEDs and OPVs.

As a Switzerland based company we aim to fulfil the highest quality standards. We deliver rapidly, precisely and reliable. We are committed to perform outstanding product development and ensure reliable commercial production of state-of-the-art materials.

Nanoparticle Engineering

Key capabilities

Rapid screening

Our strong and flexible technology allows rapid material screening.

Material flexibility

Single and multi-element oxides, metal salts (halogenides, sulphates, phosphates etc.), optional doping. Cost-efficient quantum dots.

Particle size

Particle size can be tuned between 5 and 50 nm.

Purity

Our formulations are optimized to serve the application and can be produced in electronic grade.

Uniformity

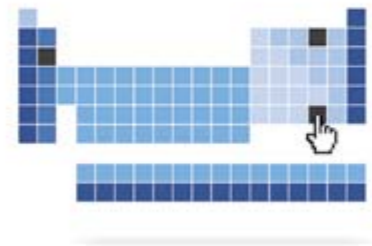
Particle size distribution is narrow and can be optimized to the customers' specifications.

Reproducibility

Our synthesis process intrinsically yields the same nanoparticles every time we make them.

Volume

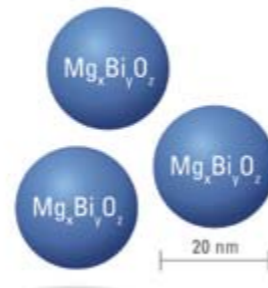
We have upscaled our production to the ton scale.



Pick nanoparticle composition on avantama.com



We produce and deliver tailor-made nanoparticles



Precise and homogeneous nanoparticles

More than 10'000 compositions, such as

Li_2MoO_4
 CaO
 MgCO_3
 MgTiO_3
 AlCeO_3
 NaCl
 K_2WO_4
 CaCO_3
 $\text{Ca}_3(\text{PO}_4)_2$
 Sc_2O_3
 V_2O_5
 MnMoO_4
 FeTiO_3
 FePO_4
 $\text{Co}_{0.5}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$
 NiCr_2O_4

NaYF_4
 ZnSnO_3
 NaYF_4
 RbF
 SrSiO_3
 $\text{Y}_2\text{Eu}_2\text{O}_3$
 YSZ
 Nb_2O_5
 MoO_3
 Pt-Rh on support
 Ag_3PO_4
 ITO
 BaSO_4
 ATO
 BaZrO_3
 CsPbCl_3

LaAlO_3
 CeVO_4
 CsPbBr_3
 Al:ZnO
 $\text{Sm}_{0.5}\text{Sr}_{0.5}\text{CoO}_3$
 $\text{Gd}_3\text{Ga}_5\text{O}_{12}$
 SrTiO_3
 NiO
 Er_2O_3
 PbO
 Mn_3O_4
 WO_3
 $\text{Pt on Ce}_x\text{ZrO}_y$
 Au on BaTiO_3
 PbWO_4
 InGaZnO_4

Formulation Engineering



Nanoparticles of choice

Solvent system of choice

Formulation of choice



Nanoparticles

ATO
BaSO₄
CaCO₃
Ca₃(PO₄)₂
Co_{0.5}Zn_{0.5}Fe₂O₄
FePO₄
CsPbBr₃
MoO₃
WO₃
Y₂Eu₂O₃
ZnSnO₃
YSZ
ZnO
etc.



Solvents

Acetone
Butyl acetate
Cyclohexanone
Ethanol
Ethyl benzoate
Glycol ethers
Hexane
Isopropanol
Monomers
Water
Xylene
etc.



Deposition

Dip coating
Doctor blading
Gravure printing
Inkjet printing
Pad printing
Screen printing
Slot-dye coating
Spin coating
Spray coating
etc.

Key capabilities

Rapid screening

Our strong and flexible technology allows rapid material screening in the R&D phase.

Material flexibility

Tailored nanoparticles and solvent and solvent-free systems of your choice.

Hydrodynamic diameter

Our unique know-how allows the fabrication of formulations with a d_{99} of below 30 nm.

Purity

Our formulations can be specified to electronic grade.

Shelf life

Formulation shelf life is aimed to be 1+ year.

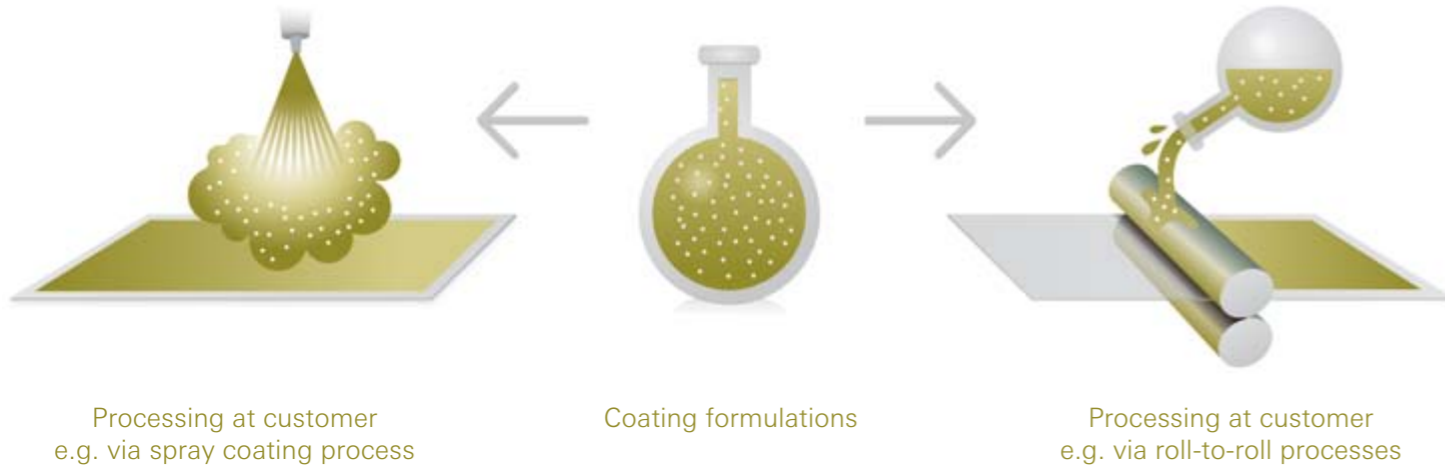
Processability

Our formulations are optimized to work perfectly in your existing production line.

Volume

We have upscaled our formulation production to the multi-ton scale.

Functions & Industries



Function

Optical materials
Photoluminescence
Antireflection
Charge transport
Downconversion
High refractive index
Electroluminescence
Upconversion

Industries

Aerospace
Automotive
Display
Electrochromism
Energy
Mobile
Organic electronics
Radiation detectors
Smart windows
Solar

Commercial production

Our ultimate goal are customized material solutions enabling the commercial production of high-value electronic and optical thin films. Our target customers can be in various industries like display or energy.

Our materials in your product

Pure nanoparticle thin films

Can be processed via water- or solvent-based formulations. Typical film thickness: 10 nm – 1 micron.

Nanocomposite films

Can be processed via solvent- or solvent-free formulations. Typical film thickness: 100 nm – 100 microns



Displays

QD enhanced displays

Industry

Consumer electronics

Applications

Backlight films, color filters, QLED, on-chip

Product

Cadmium-free quantum dots

Goal

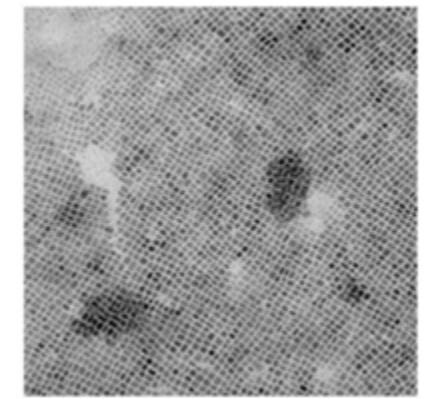
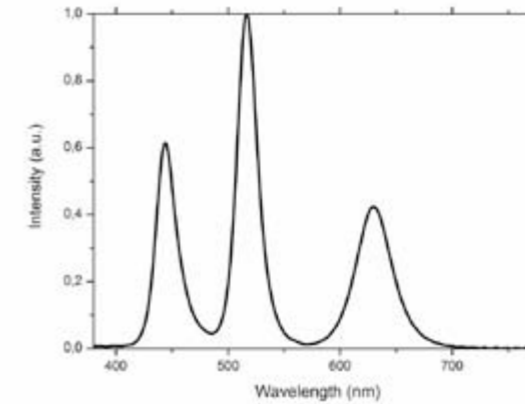
Cadmium-free QDs with high performance at low costs

Avantama performance

- QY > 95%
- FWHM < 25 nm
- Peak position: 530 nm / 630 nm
- High absorbance (2-3x higher than CdSe)

Capacity

> 1 million m²



Displays Lighting

Light extraction layer

Industry

Consumer electronics

Applications

OLED display, OLED lighting

Product

Titanate composite formulations

Goal

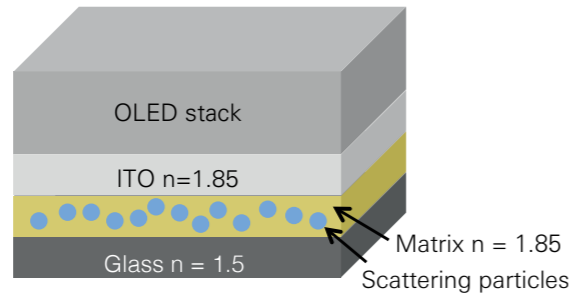
High refractive index coating with high transparency and high thermal stability

Avantama performance

- Refractive index up to 1.95
- Surface roughness < 3 nm
- Thermal stability 200°C

Capacity

Multi-ton scale



OLED OPV QLED

Charge selective layers

Industry

Printed electronics

Applications

OLEDs, OPVs, Perovskites, QLEDs

Product

Metal oxide nanoparticle formulations

Goal

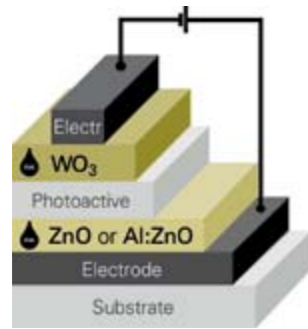
Selective layers with good compatibility with silver nanowires and processed at low temperatures and at low costs.

Avantama performance

Avantama offers a range of 30 formulations based on ZnO, Al:ZnO, WO₃, NiO, SnO₂, MoO₃/PEDOT with different viscosity, concentration and work function. The performance matches vacuum deposited layers.

Capacity

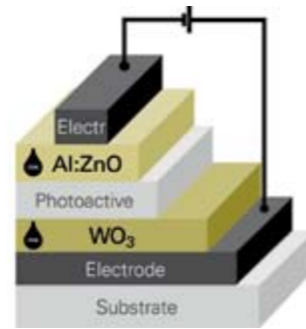
> 1 million m²



Inverted structure



Avantama formulation is printed via slot-dye, ink jet, doctor-blading etc.



Normal structure

Avantama AG

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