



Surface and Nano-Technology

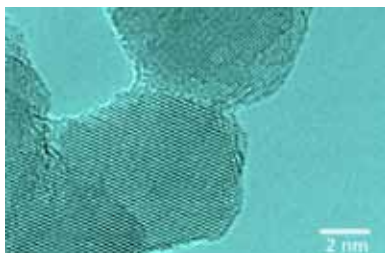
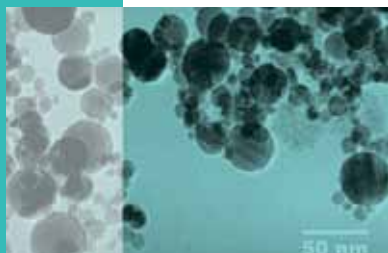
# Nanomaterials and related products

catalogue & price-list



- InP/ZnS Quantum Dots
- AgInS<sub>2</sub> Quantum Dots
- Monodisperse latexes
- BiFeO<sub>3</sub> nanoparticles
- Educational QDs kit

NanoDiamonds  
Fullerenes  
Nanotubes  
NanoGraphite  
NanoMetals  
NanoCeramics  
NanoWires  
Quantum Dots  
Ligands  
Oligoglycines  
Latexes



2024 1<sup>st</sup> edition

[www.plasmachem.com](http://www.plasmachem.com)



## **Dear Customer,**

**as a result of over 30 years experience in development, manufacturing and sales of nano-particles we are happy to present an updated issue of our general catalogue of nanomaterials and related products.**

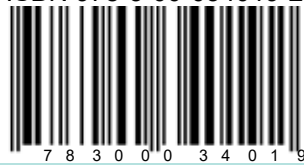
**We provide a unified source of a wide range of materials which are mostly requested by researchers working in the nanotechnology area.**

**In this edition of the catalogue you will find newly introduced products - barium titanate piezoelectric nanoparticles, copper nanoparticles ink and new gold nanoparticles, which can be used in thermal sensing applications. We are also happy to introduce a new class of materials - polymeric monodisperse beads ranging from 0,25  $\mu\text{m}$  to 10  $\mu\text{m}$ .**

*Carsten Jost*  
**CEO**

*PlasmaChem GmbH  
Schwarzschildstr. 10  
D-12489 Berlin, Germany  
Tel.: +49 30 63926313  
Fax: +49 30 63926314  
E-mail: [shop@plasmachem.com](mailto:shop@plasmachem.com)  
Internet: [shop.plasmachem.com](http://shop.plasmachem.com)*





ISBN 978-3-00-034019-2



9 783000 340192

*HRB 99010B  
VAT/USt. ID DE157830095  
Customs number DE5479908*

# Content

	page
NanoDiamonds	4
Diamond Particles: from submicron to micron	6
Carbon nanoparticles (graphene, carbon nanotubes, fullerenes, graphite etc.)	7
Oxide Nanoparticles 	9
Non-oxide Nanoparticles	19
Metal Nanoparticles	24
NanoWires	28
Salt Nano- and Microparticles	30
Quantum Dots, hydrophilic (for antibody/DNA labelling)	31
Quantum Dots, hydrophobic	35
Perovskite Quantum Dots, hydrophobic	40
Quantum Dots Kits	41
Tectomers (self-assembling oligopeptides)	42
Phosphonic Acids Derivatives (for surface modification and synthesis of particles)	43
Metal-Organic Frameworks (MOF) 	44
Latex / microbeads, monodisperse 	45
Educational kit 	48

## NanoDiamonds

All types of nanodiamonds and nanographite / nanodiamonds mixtures are produced by controlled dry detonation synthesis followed by purification procedures. We are ready to change product quality in case of special requirements.

### Graphite / Diamond Nano-Mixture,

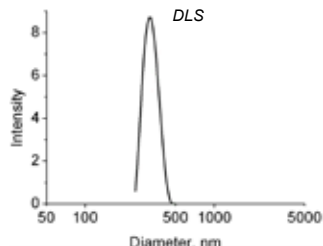
the most native, raw, just after detonation synthesis

Average diamond primary particle size: 4 nm

Diamond content: min. 20%

Ash content: < 6%

PL-GD-5g	5 g	35,00 EUR
PL-GD-25g	25 g	101,00 EUR
PL-GD-100g	100 g	361,00 EUR



### Graphite / Diamond Nano-Mixture,

purified from metallic and organic impurities

Average diamond primary particle size: 4 nm

Diamond content: min. 20%

Ash content: < 0,3%

PL-GD-MOF-5g	5 g	59,00 EUR
PL-GD-MOF-25g	25 g	175,00 EUR
PL-GD-MOF-100g	100 g	602,00 EUR

## NanoDiamonds, purified, grade G01

Enhanced suspension stability in water

Bulk density: 0,69 g/cm<sup>3</sup>

Specific surface (BET): min. 350 m<sup>2</sup>/g

Non-diamond carbon content: traces

Ash content: <1,4%

Controlled admixtures, %: Fe < 0,3; Cu < 0,01; Zn < 0,01; Mn < 0,01; Si+Cr+Ca+Ti < 0,01

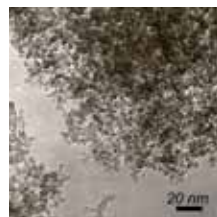
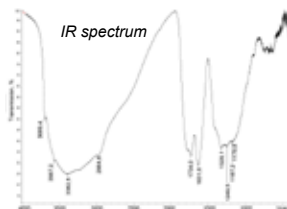
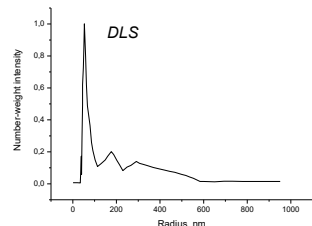
Average cluster size: ca. 4 nm

Losses at tempering: max. 2,4%

Picnometric density: 3,18 g/cm<sup>3</sup>

Zeta potential: -50 ± 5 mV

pK1	mmol/g	pK2	mmol/g	pK3	mmol/g	pK4	mmol/g	pK5	mmol/g	Total, mmol/g
3,7	0,09	4,5	0,19	6,6	0,1	8,5	0,14	9,9	0,1	0,62



PL-D-G01-1g	1 g	34,00 EUR
PL-D-G01-5g	5 g	125,00 EUR
PL-D-G01-25g	25 g	506,00 EUR
PL-D-G01-100g	100 g	1776,00 EUR

# NanoPure-G01, nanodiamonds aqueous suspension, grade G01

4 wt.% aqueous suspension of nanodiamonds, type PL-D-G01.

The nanodiamonds are preserved in the most dispersed form

PL-Nanopure-G01-10m	10 mL	22,00 EUR
PL-Nanopure-G01-50m	50 mL	89,00 EUR
PL-Nanopure-G01-100m	100 mL	125,00 EUR

## Single-Digit NanoDiamonds (SDND)

Forms transparent stable colloidal solution of nanodiamonds in water and many polar organic solvents. Free of additives and milling impurities.

Produced by chemical desintegration. Aqueous 5% solution.

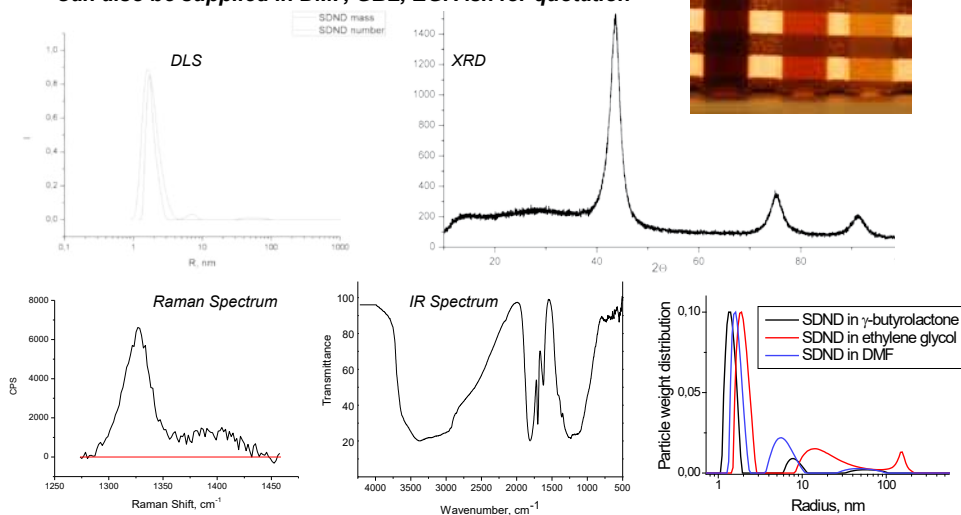
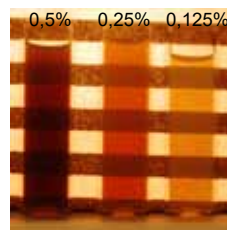
Diamond crystallite size: 3,5-5,2 nm

Specific surface: 320-350 m<sup>2</sup>/g

Particle size (DLS): 5-15 nm

Ash content: <0,4%

**Can also be supplied in DMF, GBL, EG. Ask for quotation**



pK1	mmol/g	pK2	mmol/g	pK3	mmol/g	Sum amount groups, mmol/g
3,4	0,08	6,6	0,32	9,9	0,19	0,59

PL-SDND-5p-1g	20 mL	97,00 EUR
PL-SDND-5p-10g	200 mL	786,00 EUR
PL-SDND-5p-50g	1000 mL	3327,00 EUR

## Nanodiamonds, positively charged, aq. suspension

Aqueous suspension of modified G01 nanodiamonds at 100mg/mL concentration.  
Nanodiamonds with the surface modified by polyelectrolyte electrostatic adsorption.  
Zeta potential:  $+50 \pm 5$  mV

PL-D-G01P-10m	10 mL	38,00 EUR
PL-D-G01P-50m	50 mL	128,00 EUR

## NanoDiamonds, extra-pure, grade G02

Ash content:  $< 0,1\%$

PL-D-G02-1g	1 g	95,00 EUR
PL-D-G02-10g	10 g	564,00 EUR

## Diamond particles: from sub-micron to micron



### Diamonds, 0 - 100 nm (grade 0.1/0)

PL-DD-01-0-1g	1 g (5 carat)	24,00 EUR
PL-DD-01-0-5g	5 g (25 carat)	95,00 EUR

### Diamonds, 0 - 250 nm (grade 0.25/0)

PL-DD-025-0-1g	1 g (5 carat)	24,00 EUR
PL-DD-025-0-5g	5 g (25 carat)	95,00 EUR

### Diamonds, 0 - 500 nm (grade 0.5/0)

PL-DD-05-0-1g	1 g (5 carat)	24,00 EUR
PL-DD-05-0-5g	5 g (25 carat)	95,00 EUR

### Diamonds, 500 - 1000 nm (grade 1/0.5)

PL-DD-1-05-1g	1 g (5 carat)	24,00 EUR
PL-DD-1-05-5g	5 g (25 carat)	95,00 EUR

### Diamonds, 10 - 14 $\mu$ m (grade 1200 mesh)

PL-DD-14-10-1g	1 g (5 carat)	24,00 EUR
PL-DD-14-10-5g	5 g (25 carat)	95,00 EUR

### Diamonds, 80 - 110 $\mu$ m (grade 140-170 mesh)

PL-DD-110-80-1g	1 g (5 carat)	24,00 EUR
PL-DD-110-80-5g	5 g (25 carat)	95,00 EUR

### Diamonds, 250 - 300 $\mu$ m (grade 50 - 60 mesh)

PL-DD-300-250-1g	1 g (5 carat)	24,00 EUR
PL-DD-300-250-5g	5 g (25 carat)	95,00 EUR

### Diamonds, 500 - 600 $\mu$ m (grade 30-35 mesh)

PL-DD-600-500-1g	1 g (5 carat)	24,00 EUR
PL-DD-600-500-5g	5 g (25 carat)	95,00 EUR

## Carbon Nanotubes, multiwalled

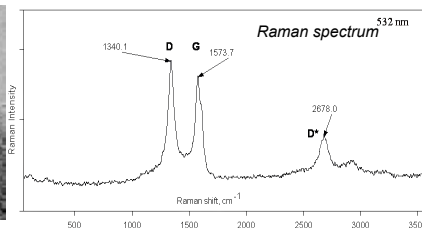
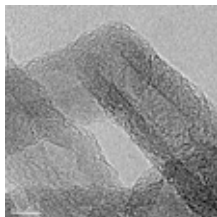
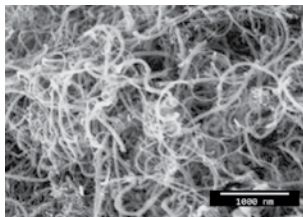
Carbon purity: min. 95%

Number of walls: 3-15

Outer diameter: 5-20 nm; Inner diameter: 2-6 nm; Length: 1-10  $\mu\text{m}$

Apparent density: 0,15-0,35 g/cm<sup>3</sup>; Loose agglomerate size: 0,1-3 mm

Specific surface: ca. 240 m<sup>2</sup>/g



PL-MCNP-1g	1 g	23,00 EUR
PL-MCNP-10g	10 g	71,00 EUR
PL-MCNP-50g	50 g	265,00 EUR
PL-MCNP-100g	100 g	422,00 EUR

## Carbon Nanotubes, multiwalled, charged, water soluble up to 30 $\mu\text{g}/\text{ml}$

Carbon nanotubes (CNTs) type PL-MCNP, additionally modified by -COOH or -SO<sub>3</sub>H groups. Soluble in water forming dark, transp. suspensions stable for many months.

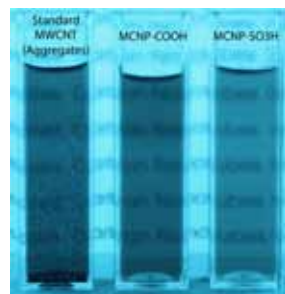
*Image: aq. suspensions of unstable unmodified (left) and stable modified CNTs.*

COOH- modified:

PL-MCNP-COOH-100mg	100 mg	59,00 EUR
PL-MCNP-COOH-500mg	500 mg	240,00 EUR
PL-MCNP-COOH-1g	1 g	349,00 EUR

SO<sub>3</sub>H- modified:

PL-MCNP-SO3H-100mg	100 mg	59,00 EUR
PL-MCNP-SO3H-500mg	500 mg	240,00 EUR
PL-MCNP-SO3H-1g	1 g	349,00 EUR



## Carbon Nanotubes, single-walled

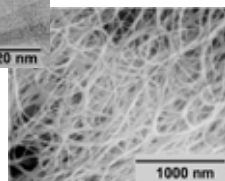
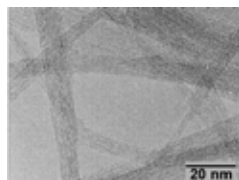
Produced by arc discharge method.

SWCNTs assembled in bundles

Carbon purity: > 85%;

Nanotube purity: > 74%;

Diameter: ca. 1,5 nm



PL-SCNP-M-100mg	100 mg	109,00 EUR
PL-SCNP-M-500mg	500 mg	433,00 EUR

## Graphene - nanoplatelets, dry

Thickness: 1-4 nm; Particles size: up to 2  $\mu\text{m}$

Specific surface area: 700-800  $\text{m}^2/\text{g}$

Purity: 91 at.%. Other elements: O < 7 at.%; N < 2 at.%

PL-P-G750-1g	1 g	23,00 EUR
PL-P-G750-10g	10 g	119,00 EUR
PL-P-G750-50g	50 g	228,00 EUR

## Graphene Oxide - aqueous dispersion

Thickness: 0,8-1,2 nm; Particles lateral size: 5-30  $\mu\text{m}$

4 mg/mL suspension in water; pH: ca. 6-7

C: 40-48%; O: 42-49 %; H: 1-4%; S: < 2%; N: < 1%

PL-GO-04p-10mL	10 mL	23,00 EUR
PL-GO-04p-25mL	25 mL	47,00 EUR
PL-GO-04p-100mL	100 mL	119,00 EUR

## Carbon Black nanopowder

The finest analogue of industrially used filler for polymer composites

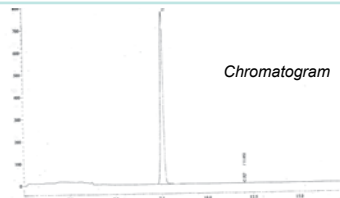
Average particle size: ca. 13 nm; Specific surface: ca. 550  $\text{m}^2/\text{g}$

Ash content: < 0,02%; Bulk density: ca. 120 g/L

PL-CB13-50g	50 g	57,00 EUR
PL-CB13-200g	200 g	176,00 EUR

## Fullerene C60, 99.5+%

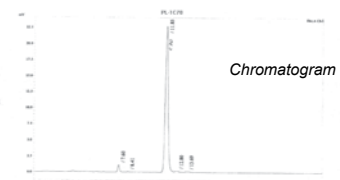
Time	Name	Volume, %
7,557	C60	99,956
11,873	C70	0,044
-	Others	0,000



PL-1C60-250mg	250 mg	49,00 EUR
PL-1C60-500mg	500 mg	79,00 EUR
PL-1C60-1g	1 g	139,00 EUR

## Fullerene C70, 99+%

Time	Name	Volume, %
7,60	C60	0,07
11,85	C70	99,91
	Others	0,002



PL-1C70-10mg	10 mg	37,00 EUR
PL-1C70-50mg	50 mg	61,00 EUR
PL-1C70-200mg	200 mg	194,00 EUR

## Oxide Nanoparticles

Along with the listed NanoCeramics many other ceramics were produced as trial batches. We are expecting here the specific wishes from our customers.

### Aluminium oxide

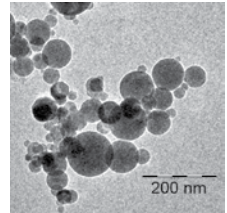
#### Al<sub>2</sub>O<sub>3</sub> - Nanopowder, alpha-phase

Particle shape: spherical

Average particle size: ca. 40 nm; Full range: 5 - 150 nm

Specific surface: > 10 m<sup>2</sup>/g

Purity: > 99,8%; X-Ray analysis: >90% α-Al<sub>2</sub>O<sub>3</sub>



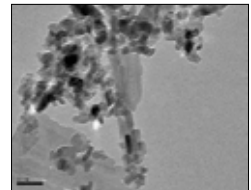
PL-A-AIO-10g	10 g	22,00 EUR
PL-A-AIO-50g	50 g	68,00 EUR
PL-A-AIO-100g	100 g	115,00 EUR

#### Al<sub>2</sub>O<sub>3</sub> - Nanopowder, gamma

Particle shape: spherical, elongated

Average particle size: ca. 40 nm; Specific surface: > 40 m<sup>2</sup>/g

Purity: > 99,9%; X-Ray analysis: γ-Al<sub>2</sub>O<sub>3</sub>



PL-G-AIO-10g	10 g	19,00 EUR
PL-G-AIO-50g	50 g	82,00 EUR
PL-G-AIO-100g	100 g	119,00 EUR

#### Al<sub>2</sub>O<sub>3</sub> - Nanopowder, theta

Specific surface area: ca. 100 m<sup>2</sup>/g

Average particle size (BET): ca. 15 nm

Purity: > 99,8% (after ignition); Loss after ignition: <3%

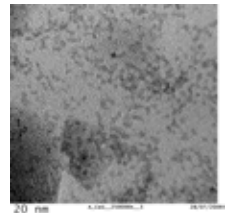
PL-T-AIO-10g	10 g	17,00 EUR
PL-T-AIO-50g	50 g	47,00 EUR
PL-T-AIO-100g	100 g	83,00 EUR

### Cerium oxide

CeO<sub>2</sub> - Nanoparticles aqueous 5 wt.% suspension

*Produced by chemical synthesis*

Average particle size: ca. 4 nm



PL-CeO-10g	200 mL	96,00 EUR
PL-CeO-50g	1000 mL	336,00 EUR

### Copper oxide

CuO - Nanoparticles powder

Purity: >99%

Average particle size: ca. 40 nm; Particle shape: spherical

Specific surface: > 10 m<sup>2</sup>/g; Bulk density: ca. 0,8 g/cm<sup>3</sup>

PL-CuO-10g	10 g	36,00 EUR
PL-CuO-50g	50 g	177,00 EUR

## Indium oxide

$\text{In}_2\text{O}_3$  - Nanopowder

*Produced by chemical synthesis*

Average particle size: ca. 4 nm

PL-InO-10g	10 g	199,00 EUR
PL-InO-25g	25 g	467,00 EUR
PL-InO-50g	50 g	859,00 EUR
PL-InO-100g	100 g	1621,00 EUR

## Iron (II,III) oxide

$\text{Fe}_3\text{O}_4$  - Nanoparticles aqueous suspension, magnetic fluid

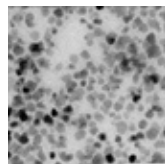
ca. 300 Gauss, aqueous suspension. *Superparamagnetic.*

Contains ca. 3% of stabilizer (oleic acid)

Average particle size: 8 nm

Concentration: ca. 7 vol.% (ca. 30 wt.%)

PL-M-Fe3O4-10m	10 mL	72,00 EUR
----------------	-------	-----------



$\text{Fe}_3\text{O}_4$  - Nanoparticles aqueous suspension, magnetic fluid,

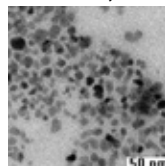
*Without organic stabilizers. Superparamagnetic.*

*Excellent for L-b-L, LB coatings and for experiments*

*where absence of organic stabilizer is desirable.*

Average particle size:  $8 \pm 3$  nm. Concentration: ca. 3%

PL-A-Fe3O4-10m	10 mL	62,00 EUR
----------------	-------	-----------



$\text{Fe}_3\text{O}_4$  - Nanoparticles aqueous suspension, magnetic fluid,

*Without organic stabilizers*

*Dispersed in water at 3 wt.%; Average particle size: ca. 40 nm*

*Can be concentrated or removed by magnet or sedimentation*

PL-A-Fe3O4-B-10m	10 mL	73,00 EUR
------------------	-------	-----------

## Iron (III) oxide

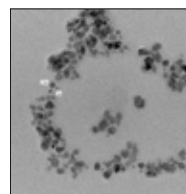
$\text{Fe}_2\text{O}_3$  - Nanoparticles aqueous suspension

*Produced by chemical synthesis*

Average particle size: 4-8 nm

Supplied as 5% aqueous suspension

PL-FeO-10g	200 mL	59,00 EUR
PL-FeO-50g	1000 mL	224,00 EUR



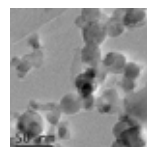
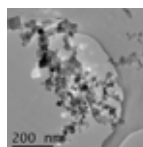
## Magnesium Oxide

MgO - Nanopowder

Primary particle average size: ca. 20 nm;

Specific surface: ca.  $50 \text{ m}^2/\text{g}$ ; Purity: > 99%

PL-MgO-25g	25 g	78,00 EUR
------------	------	-----------



## Silicon dioxide

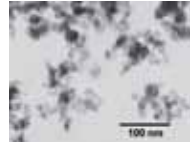
### SiO<sub>2</sub> - Fumed silica, nanopowder, hydrophilic

Primary particle average size: 7-14 nm

Specific surface: > 200 m<sup>2</sup>/g

Bulk Density: ca. 0,048 g/cm<sup>3</sup>

Purity: > 99,8% (excl. ca. 2% moisture)



PL-SiOF-25g	25 g	18,00 EUR
-------------	------	-----------

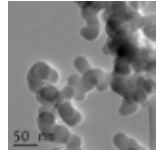
### SiO<sub>2</sub> - Fumed silica, nanopowder, hydrophobic

Primary particle average size: ca. 14 nm

Specific surface: ca. 100 m<sup>2</sup>/g

Bulk Density: ca. 0,05 g/cm<sup>3</sup>; Purity: > 99,8% (excl. stabilizer)

Modified by polydimethylsiloxane (PDMS)



PL-SiOF-PDMS-25g	25 g	59,00 EUR
------------------	------	-----------

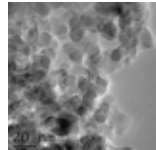
### SiO<sub>2</sub> - Fumed silica, nanopowder, hydrophobic

Primary particle average size: 7-14 nm

Specific surface: ca. 150 m<sup>2</sup>/g

Bulk Density: ca. 0,05 g/cm<sup>3</sup>; Purity: > 99,8% (excl. stabilizer)

Modified by octylsilane



PL-SiOF-OS-25g	25 g	71,00 EUR
----------------	------	-----------

### SiO<sub>2</sub> - Nanoparticles, 10 nm, 30% aq. suspension

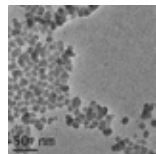
Primary particle average size: ca. 10 nm

Specific surface: ca. 320 m<sup>2</sup>/g

Density: ca. 1,2 g/cm<sup>3</sup>;

Purity of solid component: > 99,5%

Admixtures: Na ca. 0,45%



PL-SiO10-30p-100m	100 mL	23,00 EUR
-------------------	--------	-----------

### SiO<sub>2</sub> - Nanoparticles, 20 nm, aq. 50% suspension

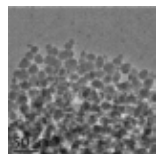
Primary particle average size: ca. 20 nm

Specific surface: ca. 140 m<sup>2</sup>/g

Density: ca. 1,4 g/cm<sup>3</sup>;

Purity of solid component: > 99,5%

Admixtures: Na ca. 0,25%



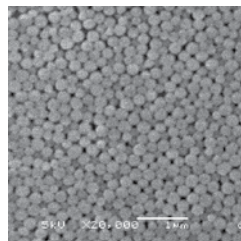
PL-SiO20-50p-100m	100 mL	25,00 EUR
-------------------	--------	-----------

## SiO<sub>2</sub> - monodisperse beads

**Size 1:** 0,25 µm

CV < 5%; 5 wt.% in water

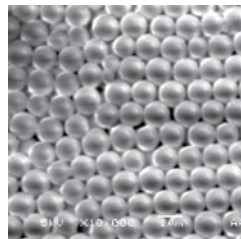
PL-SiO2-1-B-1m	1 mL	59,00 EUR
PL-SiO2-1-B-5m	5 mL	229,00 EUR



**Size 3:** 1 µm

CV < 5%; 5 wt.% in water

PL-SiO2-3-B-5m	5 mL	75,00 EUR
PL-SiO2-3-B-10m	10 mL	140,00 EUR
PL-SiO2-3-B-20m	20 mL	250,00 EUR



## Strontium oxide

### SrO - Nanopowder

*Produced by chemical synthesis*

Average particle size: 200±50 nm

PL-SrO-1g	1 g	71,00 EUR
PL-SrO-10g	10 g	482,00 EUR

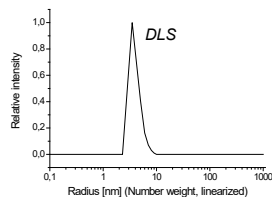
## Tin oxide

### SnO<sub>2</sub> - Nanoparticles aq. suspension, 5%

*Produced by chemical synthesis*

Average particles size 4-8 nm

Purity of dry component: min. 99,5%



PL-SnO-10g	200 mL	59,00 EUR
PL-SnO-50g	1000 mL	238,00 EUR

## Titanium oxide

### TiO<sub>2</sub> - Nanoparticles, dry powder anatase phase

*Produced by chemical synthesis*

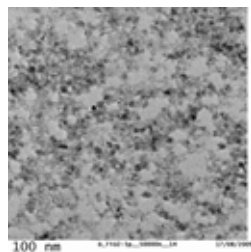
Average particle size: 4-8 nm

Loss on thempering (800 °C, 2 h): ca. 32%

Dry nanopowder, free of organic stabilizers.

Easily forms colloidal solutions in water.

PL-TiO-NO-10g	10 g	55,00 EUR
PL-TiO-NO-50g	50 g	192,00 EUR

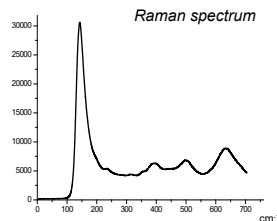
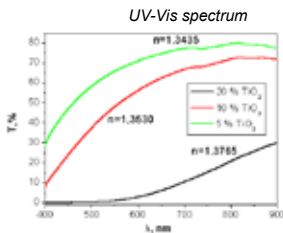
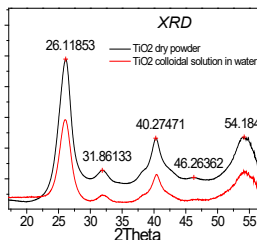


## TiO<sub>2</sub> - Nanoparticles aqueous suspension, anatase phase

*Produced by chemical synthesis*

Average particle size: 4-8 nm.

Aqueous colloidal solutions: 5, 10 or 20 wt. %



Aqueous colloidal solution, 5 wt. %

PL-TiO-5p-10g	200 mL	56,00 EUR
PL-TiO-5p-50g	1000 mL	210,00 EUR

Aqueous colloidal solution, 10 wt. %

PL-TiO-10p-10g	100 mL	65,00 EUR
PL-TiO-10p-50g	500 mL	264,00 EUR

Aqueous colloidal solution, 20 wt. %

PL-TiO-20p-10g	50 mL	77,00 EUR
PL-TiO-20p-50g	250 mL	305,00 EUR

## TiO<sub>2</sub> - Nanoparticles, type P25

*Photocatalytic standard P25.*

Dry Nanopowder. Mixed rutile / anatase phase

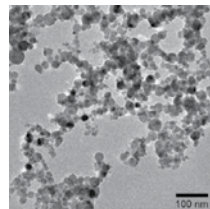
Average primary particle size: 21±5 nm.

Specific surface: 50±10 m<sup>2</sup>/g; Purity after ignition: >99,5%

Ignition loss: < 2%; Moisture: < 1,5%

Al<sub>2</sub>O<sub>3</sub> < 0,3 wt.%; SiO<sub>2</sub> < 0,2 wt. %

Tapped density: ca. 130 g/L



PL-TiO-P25-10g	10 g	23,00 EUR
PL-TiO-P25-50g	50 g	62,00 EUR

## TiO<sub>2</sub> - Nanoparticles, type P25, hydrophobized

Dry Nanopowder. Mixed rutile / anatase phase, treated with octylsilane

Average primary particle size: 21±5 nm

Specific surface: 45±10 m<sup>2</sup>/g

Purity after ignition: TiO<sub>2</sub> > 97%; SiO<sub>2</sub> < 2,5 wt. %

Ignition loss: < 5%; Moisture: < 1%

C < 3,8 wt.%;

Tapped density: ca. 200 g/L

PL-TiO-P25-HPB-10g	10 g	31,00 EUR
PL-TiO-P25-HPB-50g	50 g	71,00 EUR

## TiO<sub>2</sub> - Nanoparticles aqueous suspension, brookite/anatase

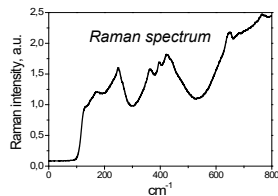
Average particle size: 2-5 nm.

Mixed brookite / anatase phase

Stabilized by tetramethylammonium hydroxide

Aqueous colloidal solution, 20 wt. %

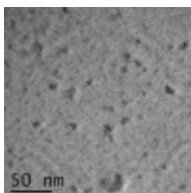
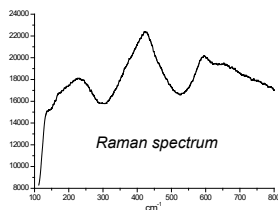
PL-TiO-N-20p-15g	75 mL	107,00 EUR
PL-TiO-N-20p-50g	250 mL	299,00 EUR



## TiO<sub>2</sub> - Nanoparticles, rutile

Average particle size: 2±1 nm. Dry nanopowder.

Readily forms colloidal solutions in water (up to 900g/L) and methanol



PL-TiO-R-1g	1 g	41,00 EUR
PL-TiO-R-5g	5 g	95,00 EUR
PL-TiO-R-25g	25 g	346,00 EUR

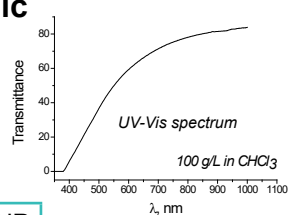
## TiO<sub>2</sub> - Nanoparticles, anatase, hydrophobic

Average particle size: 4-8 nm. Anatase phase.

Stabilized by dodecylphosphonic acid and hexylamine.

**Forms transparent colloidal solutions in chloroform.**

Supplied as a powder.



PL-TiO-HPBC-1g	1 g	44,00 EUR
PL-TiO-HPBC-10g	10 g	306,00 EUR

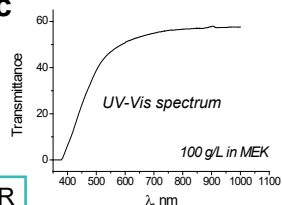
## TiO<sub>2</sub> - Nanoparticles, anatase, hydrophobic

Average particle size: 4-8 nm. Anatase phase.

Stabilized by benzoic acid.

**Forms transparent colloidal solutions in MEK (methyl ethyl ketone) and many epoxides.**

Supplied as a 100 g/L solution in MEK



PL-TiO-HPBM-10p-1g	10 mL	41,00 EUR
PL-TiO-HPBM-10p-10g	100 mL	277,00 EUR

## TiO<sub>2</sub> - Nanorods, 1% aqueous solution

Length: ca. 100 nm. Diameter: 20-40 nm

Stabilized only with citrate.

Phase: anatase

Supplied as a 1 wt.% aqueous solution



PL-TiONR-10m	10 mL	23,00 EUR
PL-TiONR-100m	100 mL	119,00 EUR

## TiO<sub>2</sub> - Nanowires

Length full range: 0,5-100 µm

Diameter: 50-100 nm

Phase: anatase

Dry powder



PL-TiOW50-100mg	100 mg	47,00 EUR
PL-TiOW50-500mg	500 mg	192,00 EUR
PL-TiOW50-1g	1 g	315,00 EUR

## Tungsten (VI) oxide

### WO<sub>3</sub> - Nanopowder

Average particles size: 100-200 nm

Purity: 99,9%

PL-WO200-5g	5 g	29,00 EUR
PL-WO200-25g	25 g	75,00 EUR
PL-WO200-100g	100 g	289,00 EUR

## Yttrium oxide

### Y<sub>2</sub>O<sub>3</sub> - Nanopowder

Average particles size: 30-50 nm

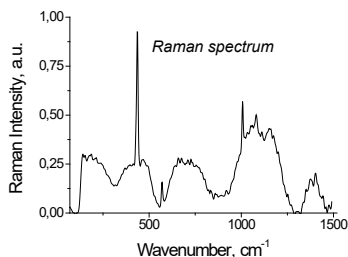
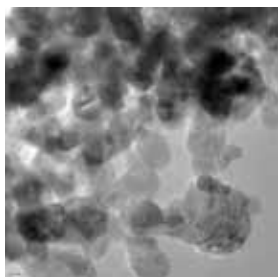
Specific surface area: ca. 40 m<sup>2</sup>/g

PL-P-Y2O3-5g	5 g	23,00 EUR
PL-P-Y2O3-25g	25 g	59,00 EUR
PL-P-Y2O3-100g	100 g	228,00 EUR

## Zinc oxide

### ZnO - Nanopowder, ca. 14 nm

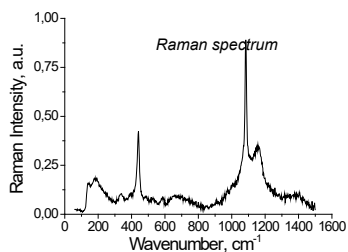
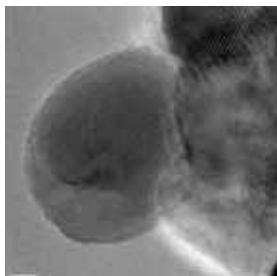
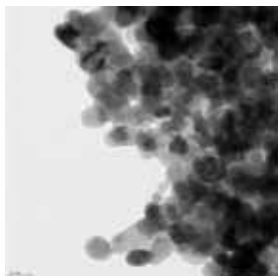
Average particle size: ca. 14 nm; Specific surface area:  $30 \pm 5 \text{ m}^2/\text{g}$  Purity: > 99%



PL-ZnO14-5g	5 g	28,00 EUR
PL-ZnO14-25g	25 g	77,00 EUR
PL-ZnO14-100g	100 g	271,00 EUR

### ZnO - Nanopowder, ca. 25 nm

Average particle size: ca. 25 nm; Specific surface area:  $19 \pm 5 \text{ m}^2/\text{g}$  Purity: > 99%



PL-ZnO25-5g	5 g	25,00 EUR
PL-ZnO25-25g	25 g	72,00 EUR
PL-ZnO25-100g	100 g	252,00 EUR

## Zirconium oxide

### ZrO<sub>2</sub> - Nanopowder, cubic

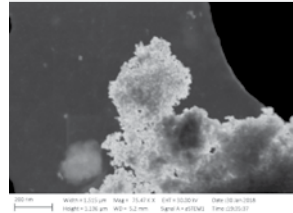
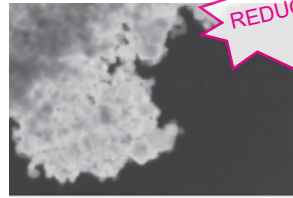
Stabilized with 6 mol% Y<sub>2</sub>O<sub>3</sub>

Average particle size: 20-50 nm; Shape: spherical.

Particles are bound by necks forming aggregates.

Cubic structure is due to the stabilizer and to the small particle size (size effect)

PL-D-C-ZrO-5g	5 g	38,00 EUR
PL-D-C-ZrO-25g	25 g	109,00 EUR
PL-D-C-ZrO-100g	100 g	164,00 EUR

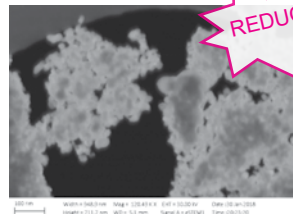


### ZrO<sub>2</sub> - Nanopowder, tetragonal

Stabilized with 6 mol% Y<sub>2</sub>O<sub>3</sub>;

Average particle size: 100-200 nm

PL-T-ZrO-5g	5 g	38,00 EUR
PL-T-ZrO-25g	25 g	109,00 EUR
PL-T-ZrO-100g	100 g	164,00 EUR



### ZrO<sub>2</sub> - Nanopowder, monoclinic

Average particle size: 5-25 nm;

Specific surface: 130±20 m<sup>2</sup>/g;

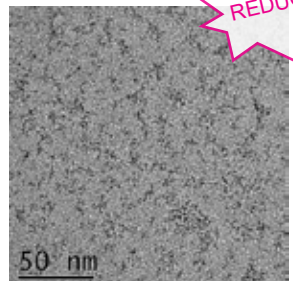
Purity: > 97,2%

Controlled admixtures, %: Y<sub>2</sub>O<sub>3</sub> < 0,018;

Al<sub>2</sub>O<sub>3</sub> < 0,24; SiO<sub>2</sub> < 0,15; HfO<sub>2</sub> < 1,91;

TiO<sub>2</sub> < 0,42; Fe<sub>2</sub>O<sub>3</sub> < 0,021

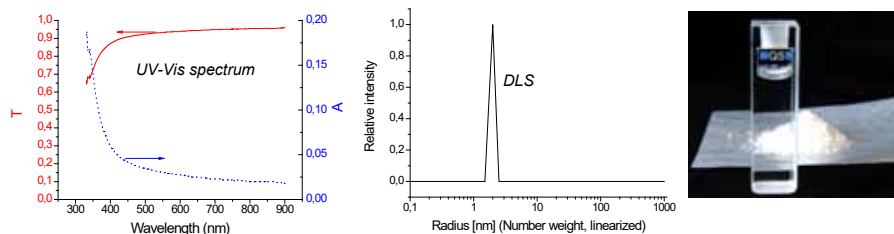
PL-M-ZrO-5g	5 g	22,00 EUR
PL-M-ZrO-25g	25 g	60,00 EUR
PL-M-ZrO-100g	100 g	110,00 EUR



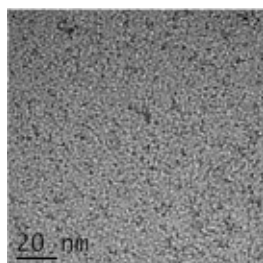
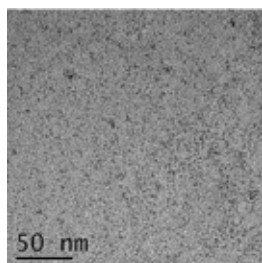
## ZrO<sub>2</sub> - Nanopowder, **hydrophilic, forms colloidal solutions**

Average particle size: ca. 3 nm

**Forms stable colloidal solutions in water**



PL-ZrO-HPL-1g	1 g	49,00 EUR
PL-ZrO-HPL-5g	5 g	129,00 EUR



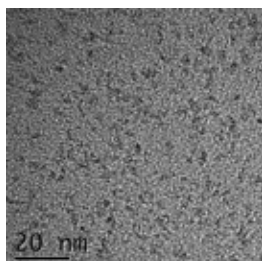
## ZrO<sub>2</sub> - Nanopowder, **hydrophobic, forms colloidal solutions**

Same as above, but additionally stabilized by benzoic acid.

Average particle size: ca. 3 nm

**Forms stable colloidal solutions in MEK and epoxides**

PL-ZrO-HPB-1g	1 g	61,00 EUR
PL-ZrO-HPB-5g	5 g	228,00 EUR



## Non-oxide Nanoparticles

Along with the listed NanoCeramics many other ceramics were produced as trial batches. Basic technology permits to produce nearly any ceramic in nanosized form, thus we are expecting here the concrete wishes from our customers.

### Aluminium Nitride

#### AlN - Nanopowder

Particle shape: spherical, hexagonal, polyhedral, fragmental

Particle size full range: 5 - 200 nm

Average particle size: 25 - 50 nm

Specific surface: > 18 m<sup>2</sup>/g

Bulk density: 0,16 - 0,28 g/cm<sup>3</sup>

Purity: > 95,0%

Controlled admixtures, %: Mg < 0,03; Na < 0,03; Fe < 0,1; Cu < 0,4; W < 0,2;

Al (free) < 2,4

X-Ray analysis: 96 % of hexagonal, lattice parameters: a = 3,114Å, c = 4,986Å

PL-PJ-AlN-5g	5 g	23,00 EUR
PL-PJ-AlN-25g	25 g	71,00 EUR
PL-PJ-AlN-100g	100 g	259,00 EUR


### Boron Carbide

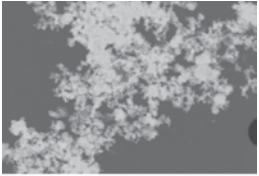
#### B<sub>4</sub>C - Nanopowder

Particle size: < 500 nm

Purity > 99 % (B+C)

Controlled admixtures:

Fe < 0.41 %, C<sub>free</sub> < 2,8 %, 

B<sub>2</sub>O<sub>3</sub> < 0,3%, B<sub>free</sub> < 1,1 %, 

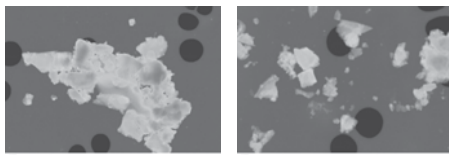


PL-HW-B4C-5g	5 g	38,00 EUR
PL-HW-B4C-25g	25 g	118,00 EUR
PL-HW-B4C-100g	100 g	398,00 EUR

## Boron Nitride, cubic

### BN - Nanopowder

Particle size full range: 80-450 nm  
Average particle size: 165±15 nm  
Specific surface: > 11 m<sup>2</sup>/g  
Content of cubic phase: > 99,0%  
Controlled admixtures, %: Mg < 0,35;  
Si < 0,14; Fe < 0,04; Ca < 0,03; Cr < 0,03



PL-IS-CBN-5g	5 g	51,00 EUR
PL-IS-CBN-25g	25 g	205,00 EUR
PL-IS-CBN-100g	100 g	723,00 EUR

## Boron Nitride, hexagonal

### BN - Nanopowder

Particle size full range: 100-10000 nm  
Average particle size from BET: 130 nm; D50: 2µm  
Specific surface: 20 ± 3 m<sup>2</sup>/g  
Purity: > 98,5%; Nitrogen content > 55%  
Controlled admixtures, %: O < 1,2; C < 0,1; B<sub>2</sub>O<sub>3</sub> < 0,2



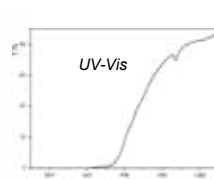
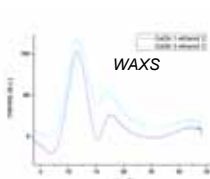
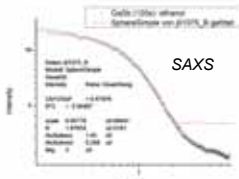
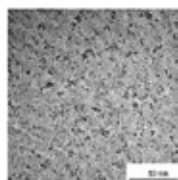
PL-H-HBN-5g	5 g	29,00 EUR
PL-H-HBN-25g	25 g	65,00 EUR
PL-H-HBN-100g	100 g	144,00 EUR

## Gallium Antimonide, hydrophobic

### GaSb - Nanopowder

Average particle size: 4 nm  
Forms clear colloidal solutions in ethanol and non-polar solvents.

**GaSb has highest known refractive index among non-metallic compounds**



PL-GaSb-10mg	10 mg	79,00 EUR
PL-GaSb-50mg	50 mg	299,00 EUR

## Gallium Arsenide, hydrophobic

### GaAs - Nanopowder

Average particle size: 4 nm  
Forms clear colloidal solutions in non-polar solvents

PL-GaAs-10mg	10 mg	79,00 EUR
PL-GaAs-50mg	50 mg	299,00 EUR

## Silicon Carbide / Silicon Nitride

### SiC - Nanopowder

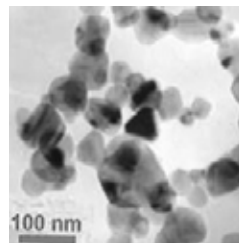
Average particle size: 20±7 nm. Cubic phase.

Specific surface: 80 ± 7 m<sup>2</sup>/g

Purity: > 98,0%

C(free) < 0,75; Si(free) < 0,25; O < 1,25; Cl < 0,25

PL-HK-SiC-5g	5 g	38,00 EUR
PL-HK-SiC-25g	25 g	118,00 EUR
PL-HK-SiC-100g	100 g	398,00 EUR



### SiC - Nanopowder

Shape: cubic, hexagonal, fragmental, single fibers

Particle size full range: 5 - 250 nm

Average particle size: 25 - 50 nm

Specific surface: > 18 m<sup>2</sup>/g

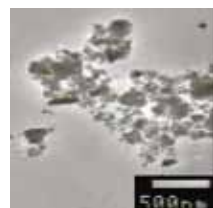
Bulk density: 0,23 - 0,35 g/cm<sup>3</sup>

Hexagonal, 98%, (a = 3,082 Å, b = 3,082 Å, c = 15,1006 Å)

Hexagonal, 2%, (a = 3,082 Å, b = 3,082 Å, c = 37,70 Å)

Purity: > 98,6%; Al < 0,03; Mg < 0,03; Na < 0,03; Fe < 0,1; Cu < 0,4; W < 0,2%

PL-PJ-SiC-5g	5 g	35,00 EUR
PL-PJ-SiC-25g	25 g	90,00 EUR
PL-PJ-SiC-100g	100 g	307,00 EUR



### Si<sub>3</sub>N<sub>4</sub> - Nanopowder

Average particle size: 25±5 nm

Specific surface area: 75±5 m<sup>2</sup>/g

Controlled admixtures, %: Fe < 0,05; Ca < 0,05; Al < 0,1

PL-N-SiN-5g	5 g	39,00 EUR
PL-N-SiN-25g	25 g	118,00 EUR
PL-N-SiN-100g	100 g	398,00 EUR

## Titanium Boride

### TiB<sub>2</sub> - Nanopowder

Purity: > 98,5%

Particle size: D90 < 1µm

Controlled admixtures, %: B<sub>2</sub>O<sub>3</sub> < 0,1; C < 0,3; Fe < 0,1; Si < 0,2

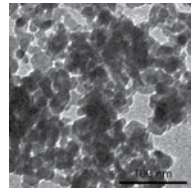
PL-A-TiB-5g	5 g	37,00 EUR
PL-A-TiB-25g	25 g	113,00 EUR
PL-A-TiB-100g	100 g	398,00 EUR

## Titanium Nitride

### TiN - Nanopowder

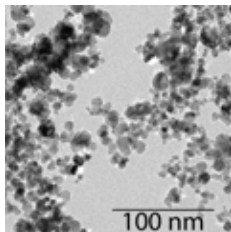
Average particle size: 50±5 nm; Specific surface area: 22±5 m<sup>2</sup>/g  
X-ray analysis: cubic phase > 99% Fe < 0,1; Si < 0,05; Ni < 0,1

PL-N-TiN-5g	5 g	35,00 EUR
PL-N-TiN-25g	25 g	106,00 EUR
PL-N-TiN-100g	100 g	388,00 EUR



### TiN - Nanopowder

Average particle size: 20±5 nm;  
Specific surface area: 80±5 m<sup>2</sup>/g  
X-ray analysis: cubic phase > 97%  
O < 3; C < 0,1; Fe < 0,02  
Forms dark transparent stable colloidal suspensions in water



PL-HK-TiN-5g	5 g	38,00 EUR
PL-HK-TiN-25g	25 g	118,00 EUR
PL-HK-TiN-100g	100 g	398,00 EUR

## Non-oxide Nanoparticles Blends

Composite ceramics based on this mixture have the highest armour properties, the powder can be used in other composites for their wear resistance increase.

## Titanium Boride - Boron Carbide

### TiB<sub>2</sub> / B<sub>4</sub>C (20 / 80)- Nanopowder mixture

Composition: TiB<sub>2</sub> > 19,7%; B<sub>4</sub>C > 77%

Controlled admixtures, %: B<sub>2</sub>O<sub>3</sub> < 0,18; C < 2,46; Fe < 0,02; Si < 0,04

PL-A-BCTB-5g	5 g	36,00 EUR
PL-A-BCTB-25g	25 g	106,00 EUR
PL-A-BCTB-100g	100 g	375,00 EUR

## Titanium Boride - Boron Carbide - Tungsten Boride

### TiB<sub>2</sub> / B<sub>4</sub>C / W<sub>2</sub>B<sub>5</sub> (30 / 10 / 60)- Nanopowder mixture

Composition: W<sub>2</sub>B<sub>5</sub> > 59,4%; TiB<sub>2</sub> > 29,5%; B<sub>4</sub>C > 9,6%

Controlled admixtures, %: B<sub>2</sub>O<sub>3</sub> < 0,11; C < 0,45; Fe < 0,1; Si < 0,15

PL-A-WTB-5g	5 g	40,00 EUR
PL-A-WTB-25g	25 g	119,00 EUR
PL-A-WTB-100g	100 g	422,00 EUR

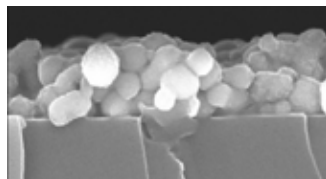
## Metal Nanoparticles

Along with listed NanoMetals, many other metals were produced as trial batches in nano-sized form, e.g. Stainless steel, Sn, Mn, Rare Earth Metals, W, Mo, V, Ag, Pt, Ir, Au. The same as in case of NanoCeramics, we are ready to produce almost any nanometal, also from material of customers.

### Copper

#### Cu - nanopowder, ca. 100 nm

Average particle size:  $100 \pm 5$  nm



PL-Cu-T100-5g	5 g	39,00 EUR
PL-Cu-T100-25g	25 g	149,00 EUR
PL-Cu-T100-100g	100 g	449,00 EUR

#### Cu - nanopowder, ca. 20 nm

Average particle size:  $20 \pm 10$  nm

Metal purity >99%

Admixture: <0,2% benzotriazole as surface stabilizer

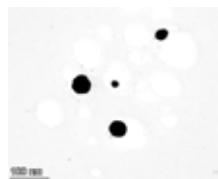
PL-Cu-M20-25g	25 g	190,00 EUR
---------------	------	------------

#### Cu - nanoparticles, aqueous dispersion

Stabilized with polyacrylic acid

Average particle size:  $70 \pm 20$  nm

Can be used as a catalyst layer for electroless deposition of conductive coatings.



PL-CuPAA3-25m	3 wt.% Cu	25 mL	45,00 EUR
PL-CuPAA3-100m	3 wt.% Cu	100 mL	150,00 EUR
PL-CuPAA10-25m	10 wt.% Cu	25 mL	120,00 EUR
PL-CuPAA10-100m	10 wt.% Cu	100 mL	400,00 EUR

### Copper-Tin alloy (90:10)

Purity: > 97%

Particle shape: spheric

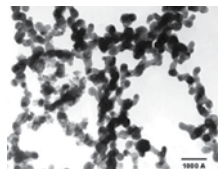
Average particle size: 70 - 80 nm. Particle size full range: 5 - 250 nm

Specific surface area: > 10 m<sup>2</sup>/g

Bulk density: > 0,8 g/cm<sup>3</sup>

Controlled admixtures, %: Fe < 0,1; W < 0,2

PL-CuSn-5g	5 g	119,00 EUR
PL-CuSn-25g	25 g	422,00 EUR



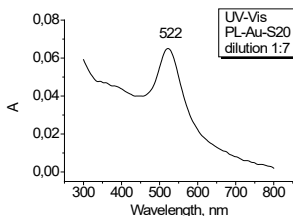
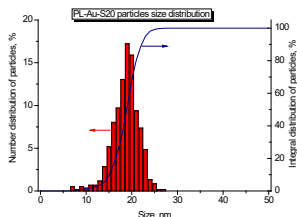
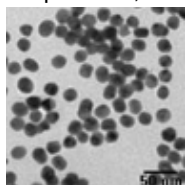
# Gold

## Au - Nanoparticles, aqueous colloidal solution

Colloidal solution in water, 0,05 mg/mL

Average particle size: 20±3 nm (other sizes available upon request)

pH ca. 8,0



PL-Au-S20-05mg	10 mL	21,00 EUR
PL-Au-S20-5mg	100 mL	96,00 EUR

## Au - dry nanopowder, hydrophobic

Forms colloidal solutions in non-polar solvents.

*Monodisperse nanoparticles, can be used for 2-D and 3-D structures build-up.*

Average particle size: ca. 2 nm

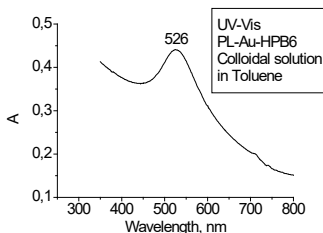
PL-Au-HPB2-10mg	10 mg	79,00 EUR
PL-Au-HPB2-50mg	50 mg	210,00 EUR

Average particle size: ca. 4 nm.

PL-Au-HPB4-10mg	10 mg	72,00 EUR
PL-Au-HPB4-50mg	50 mg	210,00 EUR

Average particle size: 6-7 nm.

PL-Au-HPB6-10mg	10 mg	72,00 EUR
PL-Au-HPB6-50mg	50 mg	210,00 EUR



## Au - nanoparticles, stabilized with tannic acid

Au concentration: 0,05 mg/mL (corresponds to 0,01% HAuCl<sub>4</sub>), aq. solution

Admixtures, %: tannic acid < 0,01; sodium citrate < 0,04

PL-Au-TAN4-25m	Average Particle size 3-4 nm	25 mL	67,00 EUR
PL-Au-TAN7-25m	Average Particle size 7-8 nm	25 mL	67,00 EUR
PL-Au-TAN14-25m	Average Particle size 13-15 nm	25 mL	67,00 EUR

## Au - nanoparticles, 50 nm, 500 ppm in water

Au concentration: 5 mg/mL, aq. solution

Admixtures: citrate, cell-culture bovine gelatine

PL-Au50-05p-1m	1 mL	121,00 EUR
PL-Au50-05p-10m	10 mL	544,00 EUR

## Au - nanoparticles, aqueous colloidal solution, TDSP stabilized

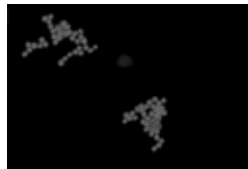
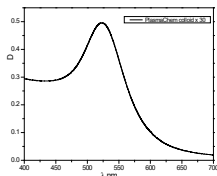
Au concentration\*:  $0.6 \pm 0.1$  mg/mL (*higher Au-concentrations available upon request*)

(\*Au concentration in colloid according to extractive photometric determination with 1-(2,4,6-trichlorophenyl)-4,4,6-trimethyl-1H,4H)-2-Pyrimidinethiol, see M. A. ANUSE et al., *Talanta*. Vol. 32, No. 10, pp. 1008-1010, 1985)

Optical density at maximum, after dilution x 30 times:  $0.5 \pm 0.01$

Particle size, average (TEM):  $14 \pm 3$  nm

Absorption maximum position:  $524 \text{ nm} \pm 2 \text{ nm}$



PL-Au-NL-10m	10 mL	64,00 EUR
PL-Au-NL-100m	100 mL	319,00 EUR

## Fe - Nanopowder with **hydrophobic** carbon shell

Purity: > 97,0%

Average particle size: 30 - 60 nm

Fe-state: ferromagnetic

Bulk density: > 0,5 g/cm<sup>3</sup>

Controlled admixtures %: Cu<0,4; W<0,2 C-content: 11-14%

Particle shape: spherical

Particle size full range: 5 - 200 nm

Specific surface area: > 12 m<sup>2</sup>/g

PL-HPB-Fe-5g	5 g	74,00 EUR
PL-HPB-Fe-25g	25 g	259,00 EUR

## Nickel

### Ni - nanopowder

Average particle size: ca. 50 nm.

PL-Ni50-1g	1 g	47,00 EUR
PL-Ni50-5g	5 g	119,00 EUR

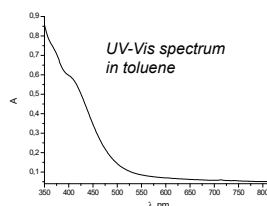
## Palladium Nanoparticles, hydrophobic

Average particle size: ca. 6-7 nm.

Form colloidal solutions in non-polar solvents.

*Monodisperse nanoparticles, can be used for 2-D and 3-D structures build-up*

PL-Pd-HPB6-10mg	10 mg	75,00 EUR
PL-Pd-HPB6-50mg	50 mg	149,00 EUR



## Platinum Nanoparticles, hydrophilic

Average particle size: ca. 3-4 nm

*Form aqueous colloidal solutions*

PL-Pt-3-10mg	10 mg	113,00 EUR
PL-Pt-3-50mg	50 mg	239,00 EUR
PL-Pt-3-250mg	250 mg	759,00 EUR

## Silicon

Si-nanopowder, dry

Average particle size: 100±5 nm

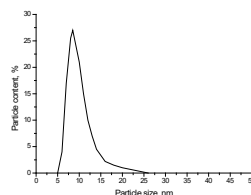
PL-Si-T100-5g	5 g	104,00 EUR
PL-Si-T100-25g	25 g	308,00 EUR
PL-Si-T100-50g	50 g	499,00 EUR

## Silver

Ag - nanoparticles, colloidal solution in water

Average particle size: ca. 10 nm; Concentration: 0,1 mg/mL

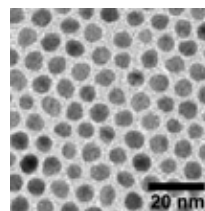
PL-Ag-S10-1mg	10 mL	21,00 EUR
PL-Ag-S10-10mg	100 mL	84,00 EUR
PL-Ag-S10-50mg	500 mL	337,00 EUR



Ag - dry nanopowder, hydrophobic

Average particle size: ca. 6-7 nm. *Forms colloidal solutions in non-polar solvents. Monodisperse nanoparticles, can be used for 2-D and 3-D structures build-up.*  $\lambda_{Abs} = 445 \text{ nm}$

PL-Ag-HPB7-10mg	10 mg	63,00 EUR
PL-Ag-HPB7-50mg	50 mg	119,00 EUR
PL-Ag-HPB7-200mg	200 mg	337,00 EUR



Ag - dry nanopowder, hydrophilic

Average particle size: ca. 100-150 nm; stabilized by PVP

PL-Ag150-10mg	10 mg	63,00 EUR
PL-Ag150-50mg	50 mg	145,00 EUR
PL-Ag150-100mg	100 mg	229,00 EUR

## NanoWires

Metallic nanowires of different elements have been synthesized. Besides of those present in this catalogue, PlasmaChem can perform custom synthesis of other nanowires like Au, Ni-Co and Ni-Fe of various compositions etc.

### Cobalt Nanowires

Average diameter: 200-300 nm

Length: up to 200  $\mu\text{m}$

PL-CoW200-10mg	10 mg	35,00 EUR
PL-CoW200-100mg	100 mg	241,00 EUR
PL-CoW200-1g	1 g	483,00 EUR

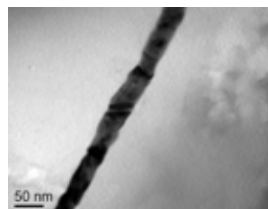


### Copper Nanowires

Average diameter: 40-50 nm

Length: up to 50  $\mu\text{m}$

PL-CuW50-10mg	10 mg	23,00 EUR
PL-CuW50-50mg	50 mg	96,00 EUR
PL-CuW50-200mg	200 mg	337,00 EUR

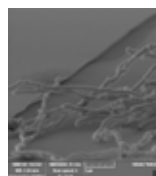


### Nickel Nanowires

Average diameter: 200-300 nm

Length: up to 200  $\mu\text{m}$

PL-NiW200-10mg	10 mg	35,00 EUR
PL-NiW200-100mg	100 mg	241,00 EUR
PL-NiW200-1g	1 g	483,00 EUR



### Silver Nanowires

PL-AgW50-10mg	Average diameter 50 nm Length: 5-50 $\mu\text{m}$	10 mg	35,00 EUR
PL-AgW50-50mg		50 mg	142,00 EUR
PL-AgW100-10mg	Average diameter 100 nm Length: 5-50 $\mu\text{m}$	10 mg	23,00 EUR
PL-AgW100-50mg		50 mg	96,00 EUR
PL-AgW200-10mg	Average diameter 200 nm Length: 5-50 $\mu\text{m}$	10 mg	23,00 EUR
PL-AgW200-50mg		50 mg	96,00 EUR

## Silver Nanowires, dispersion in isopropanol, 0.5%

PL-AgW50-IP-25m	Diameter 50 nm	25 mL, 5 g/L	385,00 EUR
PL-AgW100-IP-25m	Diameter 100 nm	25 mL, 5 g/L	289,00 EUR
PL-AgW200-IP-25m	Diameter 200 nm	25 mL, 5 g/L	289,00 EUR

## Silver Nanowires, dispersion in ethanol, 0.5%

PL-AgW50-E-25m	Diameter 50 nm	25 mL, 5 g/L	385,00 EUR
PL-AgW100-E-25m	Diameter 100 nm	25 mL, 5 g/L	289,00 EUR
PL-AgW200-E-25m	Diameter 200 nm	25 mL, 5 g/L	289,00 EUR

## Silver Nanowires, dispersion in water, 0.5%

PL-AgW50-DI-25m	Diameter 50 nm	25 mL, 5 g/L	385,00 EUR
PL-AgW100-DI-25m	Diameter 100 nm	25 mL, 5 g/L	289,00 EUR
PL-AgW200-DI-25m	Diameter 200 nm	25 mL, 5 g/L	289,00 EUR

## TiO<sub>2</sub> Nanowires

Length full range: 0,5-100 µm

Diameter: 50-100 nm

Phase: anatase

Dry powder



PL-TiOW50-100mg	100 mg	47,00 EUR
PL-TiOW50-500mg	500 mg	192,00 EUR
PL-TiOW50-1g	1 g	315,00 EUR

## ZnO Nanowires

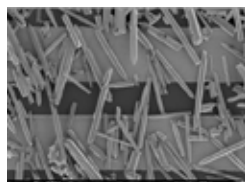
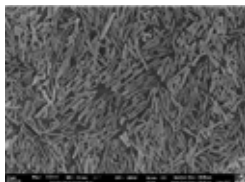
Length full range: 0,2-7 µm

Average diameter: 50-80 nm

Dry powder

Available as hydrophobic

NWs upon request



PL-ZnOW50-100mg	100 mg	47,00 EUR
PL-ZnOW50-500mg	500 mg	192,00 EUR
PL-ZnOW50-1g	1 g	314,00 EUR

## Salt Nano- and Microparticles

Inorganic carbonate microparticles soluble at low pH values or in complexing agents such as EDTA. Among various applications, they are used for production of polyelectrolyte multi-layer capsules finding various applications from drug carriers to microreactors.

### Barium titanate

BaTiO<sub>3</sub>, nanopowder, hydrophilic

Primary particle average size: 40-80 nm

**NEW!**

PL-BT-A-1g	1 g	59,00 EUR
PL-BT-A-5g	5 g	168,00 EUR

### Calcium Carbonate Nanoparticles

CaCO<sub>3</sub>, nanopowder

Primary particle average size: 90±15 nm; Specific surface: ca. 20 m<sup>2</sup>/g

Particle shape: cubic; Bulk Density: ca. 0,4 g/cm<sup>3</sup>

PL-CACOU-25g	25 g	54,00 EUR
PL-CACOU-100g	100 g	168,00 EUR

### Calcium Carbonate Microparticles

Absorbs polyelectrolytes and proteins in mesopores strongly.

Purity: > 99,0%

Particles shape: mesoporous, spherical

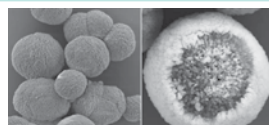
Specific surface: > 18 m<sup>2</sup>/g

**Average particle size: ca. 6 µm**

PL-CA6-1g	1 g	49,00 EUR
PL-CA6-5g	5 g	215,00 EUR
PL-CA6-10g	10 g	299,00 EUR

**Average particle size: ca. 2-3 µm**

PL-CA3-1g	1 g	78,00 EUR
PL-CA3-5g	5 g	239,00 EUR
PL-CA3-10g	10 g	360,00 EUR



### Manganese Carbonate Microparticles

MnCO<sub>3</sub>

Purity: > 99,0%

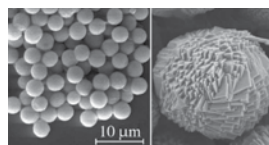
Particles shape: spherical

**Average particle size: 4-5 µm**

PL-MN5-1g	1 g	78,00 EUR
PL-MN5-5g	5 g	239,00 EUR
PL-MN5-10g	10 g	360,00 EUR

**Average particle size: 2-3 µm**

PL-MN3-1g	1 g	78,00 EUR
PL-MN3-5g	5 g	239,00 EUR
PL-MN3-10g	10 g	360,00 EUR



### Iron Iodate, nonlinear optics nanocrystals

Fe(IO<sub>3</sub>)<sub>3</sub> nanopowder

Particle shape: spherical to elongated; Primary particle average size: 40-80 nm

Second harmonic generation nanoparticles for non-linear optics

**NEW!**

PL-FeIO80-1g	1 g	95,00 EUR
PL-FeIO80-10g	10 g	350,00 EUR

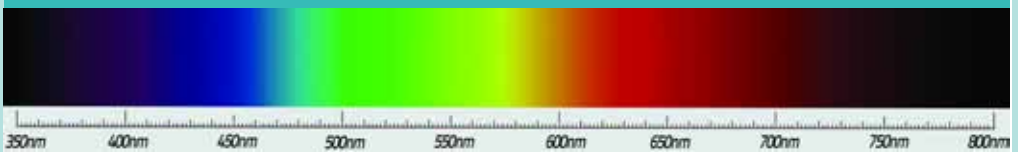
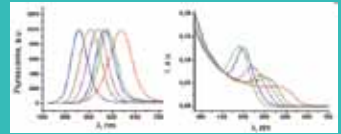
## Quantum Dots

Luminescent inorganic nanocrystals (Q-dots). The emission wavelength is a function of the crystal size or structure - crystals of the same chemistry can have the emission maxima in a wide range.

**Hydrophilic** Q-dots are coated with -COOH groups and can be easily used for labeling purposes for chemical and biological applications.

CdSe/ZnS, ZnCdSe/ZnS, ZnCuInS/ZnS (core/shell type), and perovskite Q-dots are available as **hydrophobic** and **hydrophilic** modifications.

Q-dots can be supplied up to kilogram quantities.



## CdTe Quantum Dots, hydrophilic

Easily forms colloidal solutions in water. Terminated with -COOH group. Supplied as a powder readily soluble in water. Ideal for labelling purposes. Coupling with -NH<sub>2</sub> groups can be achieved through EDC-mediated esterification.

### General labeling procedure for proteins

(adopted from Wang et al. Nanoletters 2002, vol. 2, No. 8, 817-822):

Reaction mixture containing 0,1 µM/mL CdTe quantum dots, 2 mg/mL protein, 1 mg/mL sulfo-NHS (CAS# 106627-54-7), 10 mg/mL EDC (CAS# 25952-53-8) in pH 7,0 PBS buffer is prepared and stored for 2-4 h at room temperature and then stored at 4°C overnight.

The precipitate (unconjugated Q-dots) if any is removed by centrifugation. The stock of ready-to-use product should be stored at 4°C. Optionally it can be dialyzed on a membrane with MWCO of 12000-14000 against pH 7,0 PBS buffer and stored at 4°C.

Emission wavelength may slightly shift after labeling procedure.

Emission max.	Mw	Size	Catalogue Number	Quantity	Price
<b>510 ± 5 nm</b>	~3200 Da	~1,5 nm	PL-QDN-510-5mg	5 mg	53,00 EUR
			PL-QDN-510-10mg	10 mg	95,00 EUR
			PL-QDN-510-25mg	25 mg	203,00 EUR
			PL-QDN-510-50mg	50 mg	362,00 EUR
<b>520 ± 5 nm</b>	~16000 Da	~2,0 nm	PL-QDN-520-5mg	5 mg	53,00 EUR
			PL-QDN-520-10mg	10 mg	95,00 EUR
			PL-QDN-520-25mg	25 mg	203,00 EUR
			PL-QDN-520-50mg	50 mg	362,00 EUR

<b>530 ± 5 nm</b>	~20000 Da	~2,2 nm	PL-QDN-530-5mg	5 mg	53,00 EUR
			PL-QDN-530-10mg	10 mg	95,00 EUR
			PL-QDN-530-25mg	25 mg	203,00 EUR
			PL-QDN-530-50mg	50 mg	362,00 EUR
<b>540 ± 5 nm</b>	~25000 Da	~2,3 nm	PL-QDN-540-5mg	5 mg	53,00 EUR
			PL-QDN-540-10mg	10 mg	95,00 EUR
			PL-QDN-540-25mg	25 mg	203,00 EUR
			PL-QDN-540-50mg	50 mg	362,00 EUR
<b>550 ± 5 nm</b>	~32000 Da	~2,6 nm	PL-QDN-550-5mg	5 mg	53,00 EUR
			PL-QDN-550-10mg	10 mg	95,00 EUR
			PL-QDN-550-25mg	25 mg	203,00 EUR
			PL-QDN-550-50mg	50 mg	362,00 EUR
<b>560 ± 5 nm</b>	~55000 Da	~3,0 nm	PL-QDN-560-5mg	5 mg	53,00 EUR
			PL-QDN-560-10mg	10 mg	95,00 EUR
			PL-QDN-560-25mg	25 mg	203,00 EUR
			PL-QDN-560-50mg	50 mg	362,00 EUR
<b>570 ± 5 nm</b>	~59000 Da	~3,1 nm	PL-QDN-570-5mg	5 mg	53,00 EUR
			PL-QDN-570-10mg	10 mg	95,00 EUR
			PL-QDN-570-25mg	25 mg	203,00 EUR
			PL-QDN-570-50mg	50 mg	362,00 EUR
<b>580 ± 5 nm</b>	~67000 Da	~3,2 nm	PL-QDN-580-5mg	5 mg	53,00 EUR
			PL-QDN-580-10mg	10 mg	95,00 EUR
			PL-QDN-580-25mg	25 mg	203,00 EUR
			PL-QDN-580-50mg	50 mg	362,00 EUR
<b>590 ± 5 nm</b>	~71000 Da	~3,3 nm	PL-QDN-590-5mg	5 mg	53,00 EUR
			PL-QDN-590-10mg	10 mg	95,00 EUR
			PL-QDN-590-25mg	25 mg	203,00 EUR
			PL-QDN-590-50mg	50 mg	362,00 EUR
<b>600 ± 5 nm</b>	~76000 Da	~3,4 nm	PL-QDN-600-5mg	5 mg	53,00 EUR
			PL-QDN-600-10mg	10 mg	95,00 EUR
			PL-QDN-600-25mg	25 mg	203,00 EUR
			PL-QDN-600-50mg	50 mg	362,00 EUR
<b>610 ± 5 nm</b>	~81000 Da	~3,5 nm	PL-QDN-610-5mg	5 mg	53,00 EUR
			PL-QDN-610-10mg	10 mg	95,00 EUR
			PL-QDN-610-25mg	25 mg	203,00 EUR
			PL-QDN-610-50mg	50 mg	362,00 EUR

<b>620 ± 5 nm</b>	~88000 Da	~3,6 nm	PL-QDN-620-5mg	5 mg	53,00 EUR
			PL-QDN-620-10mg	10 mg	95,00 EUR
			PL-QDN-620-25mg	25 mg	203,00 EUR
			PL-QDN-620-50mg	50 mg	362,00 EUR
<b>630 ± 5 nm</b>	~89000 Da	~3,6 nm	PL-QDN-630-5mg	5 mg	53,00 EUR
			PL-QDN-630-10mg	10 mg	95,00 EUR
			PL-QDN-630-25mg	25 mg	203,00 EUR
			PL-QDN-630-50mg	50 mg	362,00 EUR
<b>640 ± 5 nm</b>	~90000 Da	~3,7 nm	PL-QDN-640-5mg	5 mg	53,00 EUR
			PL-QDN-640-10mg	10 mg	95,00 EUR
			PL-QDN-640-25mg	25 mg	203,00 EUR
			PL-QDN-640-50mg	50 mg	362,00 EUR
<b>650 ± 5 nm</b>	~103000 Da	~3,8 nm	PL-QDN-650-5mg	5 mg	53,00 EUR
			PL-QDN-650-10mg	10 mg	95,00 EUR
			PL-QDN-650-25mg	25 mg	203,00 EUR
			PL-QDN-650-50mg	50 mg	362,00 EUR
<b>660 ± 5 nm</b>	~111000 Da	~3,9 nm	PL-QDN-660-5mg	5 mg	53,00 EUR
			PL-QDN-660-10mg	10 mg	95,00 EUR
			PL-QDN-660-25mg	25 mg	203,00 EUR
			PL-QDN-660-50mg	50 mg	362,00 EUR
<b>670 ± 5 nm</b>	~124000 Da	~4,0 nm	PL-QDN-670-5mg	5 mg	53,00 EUR
			PL-QDN-670-10mg	10 mg	95,00 EUR
			PL-QDN-670-25mg	25 mg	203,00 EUR
			PL-QDN-670-50mg	50 mg	362,00 EUR
<b>680 ± 5 nm</b>	~146000 Da	~4,2 nm	PL-QDN-680-5mg	5 mg	53,00 EUR
			PL-QDN-680-10mg	10 mg	95,00 EUR
			PL-QDN-680-25mg	25 mg	203,00 EUR
			PL-QDN-680-50mg	50 mg	362,00 EUR
<b>690 ± 5 nm</b>	~160000 Da	~4,3 nm	PL-QDN-690-5mg	5 mg	53,00 EUR
			PL-QDN-690-10mg	10 mg	95,00 EUR
			PL-QDN-690-25mg	25 mg	203,00 EUR
			PL-QDN-690-50mg	50 mg	362,00 EUR
<b>700 ± 5 nm</b>	~177000 Da	~4,5 nm	PL-QDN-700-5mg	5 mg	53,00 EUR
			PL-QDN-700-10mg	10 mg	95,00 EUR
			PL-QDN-700-25mg	25 mg	203,00 EUR
			PL-QDN-700-50mg	50 mg	362,00 EUR

<b>710 ± 5 nm</b>	~200000 Da	~4,7 nm	PL-QDN-710-5mg	5 mg	53,00 EUR
			PL-QDN-710-10mg	10 mg	95,00 EUR
			PL-QDN-710-25mg	25 mg	203,00 EUR
			PL-QDN-710-50mg	50 mg	362,00 EUR
<b>720 ± 5 nm</b>	~230000 Da	~5,0 nm	PL-QDN-720-5mg	5 mg	53,00 EUR
			PL-QDN-720-10mg	10 mg	95,00 EUR
			PL-QDN-720-25mg	25 mg	203,00 EUR
			PL-QDN-720-50mg	50 mg	362,00 EUR
<b>730 ± 5 nm</b>	~320000 Da	~5,4 nm	PL-QDN-730-5mg	5 mg	53,00 EUR
			PL-QDN-730-10mg	10 mg	95,00 EUR
			PL-QDN-730-25mg	25 mg	203,00 EUR
			PL-QDN-730-50mg	50 mg	362,00 EUR
<b>740 ± 5 nm</b>	~430000 Da	~6,0 nm	PL-QDN-740-5mg	5 mg	53,00 EUR
			PL-QDN-740-10mg	10 mg	95,00 EUR
			PL-QDN-740-25mg	25 mg	203,00 EUR
			PL-QDN-740-50mg	50 mg	362,00 EUR
<b>750 ± 5 nm</b>	~550000 Da	~6,5 nm	PL-QDN-750-5mg	5 mg	53,00 EUR
			PL-QDN-750-10mg	10 mg	95,00 EUR
			PL-QDN-750-25mg	25 mg	203,00 EUR
			PL-QDN-750-50mg	50 mg	362,00 EUR
<b>760 ± 5 nm</b>	~700000 Da	~7,1 nm	PL-QDN-760-5mg	5 mg	53,00 EUR
			PL-QDN-760-10mg	10 mg	95,00 EUR
			PL-QDN-760-25mg	25 mg	203,00 EUR
			PL-QDN-760-50mg	50 mg	362,00 EUR
<b>770 ± 5 nm</b>	~900000 Da	~7,8 nm	PL-QDN-770-5mg	5 mg	53,00 EUR
			PL-QDN-770-10mg	10 mg	95,00 EUR
			PL-QDN-770-25mg	25 mg	203,00 EUR
			PL-QDN-770-50mg	50 mg	362,00 EUR
<b>780 ± 5 nm</b>	~1000000 Da	~8,6 nm	PL-QDN-780-5mg	5 mg	53,00 EUR
			PL-QDN-780-10mg	10 mg	95,00 EUR
			PL-QDN-780-25mg	25 mg	203,00 EUR
			PL-QDN-780-50mg	50 mg	362,00 EUR
<b>790 ± 5 nm</b>	~1630000 Da	~9,4 nm	PL-QDN-790-5mg	5 mg	53,00 EUR
			PL-QDN-790-10mg	10 mg	95,00 EUR
			PL-QDN-790-25mg	25 mg	203,00 EUR
			PL-QDN-790-50mg	50 mg	362,00 EUR

## ZnCdSe/ZnS (core/shell) Quantum Dots, dry, hydrophobic

Highly luminescent semiconductor nanocrystals coated with hydrophobic organic molecules. Readily soluble in toluene, chloroform, tetrahydrofuran, pyridine etc. Not soluble in water, alcohols, ethers.

<b>440 ± 5 nm</b>	~600000 Da	~ 6 nm	PL-QD-O-440-5mg	5 mg	56,00 EUR
			PL-QD-O-440-10mg	10 mg	99,00 EUR
			PL-QD-O-440-25mg	25 mg	215,00 EUR
			PL-QD-O-440-50mg	50 mg	379,00 EUR
<b>480 ± 5 nm</b>	~640000 Da	~ 6 nm	PL-QD-O-480-5mg	5 mg	56,00 EUR
			PL-QD-O-480-10mg	10 mg	99,00 EUR
			PL-QD-O-480-25mg	25 mg	215,00 EUR
			PL-QD-O-480-50mg	50 mg	379,00 EUR

## CdSe/ZnS (core/shell) Quantum Dots, dry, hydrophobic

Highly luminescent semiconductor nanocrystals coated with hydrophobic organic molecules. Readily soluble in toluene, chloroform, tetrahydrofuran, pyridine etc. Not soluble in water, alcohols, ethers. ZnS shell thickness - ca. 0,6 nm.

<b>530 ± 5 nm</b>	~53000 Da	Core Dia. ~ 2,5 nm	PL-QD-O-530-5mg	5 mg	56,00 EUR
			PL-QD-O-530-10mg	10 mg	99,00 EUR
			PL-QD-O-530-25mg	25 mg	215,00 EUR
			PL-QD-O-530-50mg	50 mg	379,00 EUR
<b>540 ± 5 nm</b>	~59000 Da	Core Dia. ~ 2,6 nm	PL-QD-O-540-5mg	5 mg	56,00 EUR
			PL-QD-O-540-10mg	10 mg	99,00 EUR
			PL-QD-O-540-25mg	25 mg	215,00 EUR
			PL-QD-O-540-50mg	50 mg	379,00 EUR
<b>550 ± 5 nm</b>	~68000 Da	Core Dia. ~ 2,9 nm	PL-QD-O-550-5mg	5 mg	56,00 EUR
			PL-QD-O-550-10mg	10 mg	99,00 EUR
			PL-QD-O-550-25mg	25 mg	215,00 EUR
			PL-QD-O-550-50mg	50 mg	379,00 EUR
<b>560 ± 5 nm</b>	~79000 Da	Core Dia. ~ 3,0 nm	PL-QD-O-560-5mg	5 mg	56,00 EUR
			PL-QD-O-560-10mg	10 mg	99,00 EUR
			PL-QD-O-560-25mg	25 mg	215,00 EUR
			PL-QD-O-560-50mg	50 mg	379,00 EUR
<b>570 ± 5 nm</b>	~93000 Da	Core Dia. ~ 3,3 nm	PL-QD-O-570-5mg	5 mg	56,00 EUR
			PL-QD-O-570-10mg	10 mg	99,00 EUR
			PL-QD-O-570-25mg	25 mg	215,00 EUR
			PL-QD-O-570-50mg	50 mg	379,00 EUR

<b>580 ± 5 nm</b>	~112000 Da	Core Dia. ~ 3,5 nm	PL-QD-O-580-5mg	5 mg	56,00 EUR
			PL-QD-O-580-10mg	10 mg	99,00 EUR
			PL-QD-O-580-25mg	25 mg	215,00 EUR
			PL-QD-O-580-50mg	50 mg	379,00 EUR
<b>590 ± 5 nm</b>	~138000 Da	Core Dia. ~ 3,7 nm	PL-QD-O-590-5mg	5 mg	56,00 EUR
			PL-QD-O-590-10mg	10 mg	99,00 EUR
			PL-QD-O-590-25mg	25 mg	215,00 EUR
			PL-QD-O-590-50mg	50 mg	379,00 EUR
<b>600 ± 5 nm</b>	~173000 Da	Core Dia. ~ 4,0 nm	PL-QD-O-600-5mg	5 mg	56,00 EUR
			PL-QD-O-600-10mg	10 mg	99,00 EUR
			PL-QD-O-600-25mg	25 mg	215,00 EUR
			PL-QD-O-600-50mg	50 mg	379,00 EUR
<b>610 ± 5 nm</b>	~221000 Da	Core Dia. ~ 4,4 nm	PL-QD-O-610-5mg	5 mg	56,00 EUR
			PL-QD-O-610-10mg	10 mg	99,00 EUR
			PL-QD-O-610-25mg	25 mg	215,00 EUR
			PL-QD-O-610-50mg	50 mg	379,00 EUR
<b>620 ± 5 nm</b>	~285000 Da	Core Dia. ~ 4,8 nm	PL-QD-O-620-5mg	5 mg	56,00 EUR
			PL-QD-O-620-10mg	10 mg	99,00 EUR
			PL-QD-O-620-25mg	25 mg	215,00 EUR
			PL-QD-O-620-50mg	50 mg	379,00 EUR
<b>630 ± 5 nm</b>	~375000 Da	Core Dia. ~ 5,4 nm	PL-QD-O-630-5mg	5 mg	56,00 EUR
			PL-QD-O-630-10mg	10 mg	99,00 EUR
			PL-QD-O-630-25mg	25 mg	215,00 EUR
			PL-QD-O-630-50mg	50 mg	379,00 EUR
<b>640 ± 5 nm</b>	~499000 Da	Core Dia. ~ 6,0 nm	PL-QD-O-640-5mg	5 mg	56,00 EUR
			PL-QD-O-640-10mg	10 mg	99,00 EUR
			PL-QD-O-640-25mg	25 mg	215,00 EUR
			PL-QD-O-640-50mg	50 mg	379,00 EUR
<b>650 ± 5 nm</b>	~671000 Da	Core Dia. ~ 6,7 nm	PL-QD-O-650-5mg	5 mg	56,00 EUR
			PL-QD-O-650-10mg	10 mg	99,00 EUR
			PL-QD-O-650-25mg	25 mg	215,00 EUR
			PL-QD-O-650-50mg	50 mg	379,00 EUR

## ZnCdSeS Quantum Dots, low-Cd, hydrophobic

Alloyed QDs are the newest generation of low-cadmium, highly luminescent semiconductor nanocrystals with **improved stability** and compatibility with composites. Coated with hydrophobic organic molecules. Readily soluble in hexane, heptane, toluene, chloroform, tetrahydrofuran, pyridine. Diameter ca. 6 nm. Supplied dry.

<b>470 ± 5 nm</b>	PL-QD-OA-470-5mg	5 mg	44,00 EUR
	PL-QD-OA-470-10mg	10 mg	79,00 EUR
	PL-QD-OA-470-25mg	25 mg	161,00 EUR
	PL-QD-OA-470-50mg	50 mg	299,00 EUR
<b>480 ± 5 nm</b>	PL-QD-OA-480-5mg	5 mg	44,00 EUR
	PL-QD-OA-480-10mg	10 mg	79,00 EUR
	PL-QD-OA-480-25mg	25 mg	161,00 EUR
	PL-QD-OA-480-50mg	50 mg	299,00 EUR
<b>490 ± 5 nm</b>	PL-QD-OA-490-5mg	5 mg	44,00 EUR
	PL-QD-OA-490-10mg	10 mg	79,00 EUR
	PL-QD-OA-490-25mg	25 mg	161,00 EUR
	PL-QD-OA-490-50mg	50 mg	299,00 EUR
<b>500 ± 5 nm</b>	PL-QD-OA-500-5mg	5 mg	44,00 EUR
	PL-QD-OA-500-10mg	10 mg	79,00 EUR
	PL-QD-OA-500-25mg	25 mg	161,00 EUR
	PL-QD-OA-500-50mg	50 mg	299,00 EUR
<b>510 ± 5 nm</b>	PL-QD-OA-510-5mg	5 mg	44,00 EUR
	PL-QD-OA-510-10mg	10 mg	79,00 EUR
	PL-QD-OA-510-25mg	25 mg	161,00 EUR
	PL-QD-OA-510-50mg	50 mg	299,00 EUR
<b>520 ± 5 nm</b>	PL-QD-OA-520-5mg	5 mg	44,00 EUR
	PL-QD-OA-520-10mg	10 mg	79,00 EUR
	PL-QD-OA-520-25mg	25 mg	161,00 EUR
	PL-QD-OA-520-50mg	50 mg	299,00 EUR
<b>530 ± 5 nm</b>	PL-QD-OA-530-5mg	5 mg	44,00 EUR
	PL-QD-OA-530-10mg	10 mg	79,00 EUR
	PL-QD-OA-530-25mg	25 mg	161,00 EUR
	PL-QD-OA-530-50mg	50 mg	299,00 EUR
<b>540 ± 5 nm</b>	PL-QD-OA-540-5mg	5 mg	44,00 EUR
	PL-QD-OA-540-10mg	10 mg	79,00 EUR
	PL-QD-OA-540-25mg	25 mg	161,00 EUR
	PL-QD-OA-540-50mg	50 mg	299,00 EUR

<b>550 ± 5 nm</b>	PL-QD-OA-550-5mg	5 mg	44,00 EUR
	PL-QD-OA-550-10mg	10 mg	79,00 EUR
	PL-QD-OA-550-25mg	25 mg	161,00 EUR
	PL-QD-OA-550-50mg	50 mg	299,00 EUR
<b>560 ± 5 nm</b>	PL-QD-OA-560-5mg	5 mg	44,00 EUR
	PL-QD-OA-560-10mg	10 mg	79,00 EUR
	PL-QD-OA-560-25mg	25 mg	161,00 EUR
	PL-QD-OA-560-50mg	50 mg	299,00 EUR
<b>570 ± 5 nm</b>	PL-QD-OA-570-5mg	5 mg	44,00 EUR
	PL-QD-OA-570-10mg	10 mg	79,00 EUR
	PL-QD-OA-570-25mg	25 mg	161,00 EUR
	PL-QD-OA-570-50mg	50 mg	299,00 EUR
<b>580 ± 5 nm</b>	PL-QD-OA-580-5mg	5 mg	44,00 EUR
	PL-QD-OA-580-10mg	10 mg	79,00 EUR
	PL-QD-OA-580-25mg	25 mg	161,00 EUR
	PL-QD-OA-580-50mg	50 mg	299,00 EUR
<b>590 ± 5 nm</b>	PL-QD-OA-590-5mg	5 mg	44,00 EUR
	PL-QD-OA-590-10mg	10 mg	79,00 EUR
	PL-QD-OA-590-25mg	25 mg	161,00 EUR
	PL-QD-OA-590-50mg	50 mg	299,00 EUR
<b>600 ± 5 nm</b>	PL-QD-OA-600-5mg	5 mg	44,00 EUR
	PL-QD-OA-600-10mg	10 mg	79,00 EUR
	PL-QD-OA-600-25mg	25 mg	161,00 EUR
	PL-QD-OA-600-50mg	50 mg	299,00 EUR
<b>610 ± 5 nm</b>	PL-QD-OA-610-5mg	5 mg	44,00 EUR
	PL-QD-OA-610-10mg	10 mg	79,00 EUR
	PL-QD-OA-610-25mg	25 mg	161,00 EUR
	PL-QD-OA-610-50mg	50 mg	299,00 EUR
<b>620 ± 5 nm</b>	PL-QD-OA-620-5mg	5 mg	44,00 EUR
	PL-QD-OA-620-10mg	10 mg	79,00 EUR
	PL-QD-OA-620-25mg	25 mg	161,00 EUR
	PL-QD-OA-620-50mg	50 mg	299,00 EUR
<b>630 ± 5 nm</b>	PL-QD-OA-630-5mg	5 mg	44,00 EUR
	PL-QD-OA-630-10mg	10 mg	79,00 EUR
	PL-QD-OA-630-25mg	25 mg	161,00 EUR
	PL-QD-OA-630-50mg	50 mg	299,00 EUR

## Zn-Cu-In-S/ZnS Quantum Dots, cadmium free, hydrophobic

**Non-toxic** luminescent Zn-Cu-In-S / ZnS (core / shell) quantum dots coated with hydrophobic organic ligands. Readily soluble in toluene, chloroform and similar solvents. Not soluble in water, alcohols, ethers. Emission peak width (FWHM) ca. 100 nm. Large Stokes shift (ca. 120 nm). Particle size: 4-5 nm. Supplied as a readily soluble powder



### 530 ± 15 nm $\lambda$ emission maximum

PL-QD-CF-530-25mg	25 mg	108,00 EUR
PL-QD-CF-530-100mg	100 mg	338,00 EUR
PL-QD-CF-530-250mg	250 mg	765,00 EUR

### 560 ± 15 nm $\lambda$ emission maximum

PL-QD-CF-560-25mg	25 mg	108,00 EUR
PL-QD-CF-560-100mg	100 mg	338,00 EUR
PL-QD-CF-560-250mg	250 mg	765,00 EUR

### 590 ± 15 nm $\lambda$ emission maximum

PL-QD-CF-590-25mg	25 mg	108,00 EUR
PL-QD-CF-590-100mg	100 mg	338,00 EUR
PL-QD-CF-590-250mg	250 mg	765,00 EUR

### 610 ± 15 nm $\lambda$ emission maximum

PL-QD-CF-610-25mg	25 mg	108,00 EUR
PL-QD-CF-610-100mg	100 mg	338,00 EUR
PL-QD-CF-610-250mg	250 mg	765,00 EUR

### 650 ± 25 nm $\lambda$ emission maximum

PL-QD-CF-650-25mg	25 mg	108,00 EUR
PL-QD-CF-650-100mg	100 mg	338,00 EUR
PL-QD-CF-650-250mg	250 mg	765,00 EUR

### 700 ± 25 nm $\lambda$ emission maximum

PL-QD-CF-700-25mg	25 mg	108,00 EUR
PL-QD-CF-700-100mg	100 mg	338,00 EUR
PL-QD-CF-700-250mg	250 mg	765,00 EUR

## AgInS<sub>2</sub> / ZnS Quantum Dots, Cd-free, Cu-free, hydrophobic

**Non-toxic** luminescent AgInS<sub>2</sub> / ZnS (core/shell) quantum dots coated with hydrophobic organic ligands. Readily soluble in hexane, toluene, chloroform and similar solvents. Not soluble in water, alcohols, ethers.

Emission peak width (FWHM) ca. 80-160 nm.

Supplied as a readily soluble powder



### 600 ± 20 nm λ emission maximum

PL-QD-AIS-600-10mg	10 mg	60,00 EUR
PL-QD-AIS-600-25mg	25 mg	140,00 EUR
PL-QD-AIS-600-100mg	100 mg	400,00 EUR

### 640 ± 20 nm λ emission maximum

PL-QD-AIS-640-10mg	10 mg	60,00 EUR
PL-QD-AIS-640-25mg	25 mg	140,00 EUR
PL-QD-AIS-640-100mg	100 mg	400,00 EUR

### 710 ± 20 nm λ emission maximum

PL-QD-AIS-710-10mg	10 mg	60,00 EUR
PL-QD-AIS-710-25mg	25 mg	140,00 EUR
PL-QD-AIS-710-100mg	100 mg	400,00 EUR

### 760 ± 20 nm λ emission maximum

PL-QD-AIS-760-10mg	10 mg	60,00 EUR
PL-QD-AIS-760-25mg	25 mg	140,00 EUR
PL-QD-AIS-760-100mg	100 mg	400,00 EUR

## InP / ZnS Quantum Dots, Cd/Pb/Cu-free, hydrophobic

**Non-toxic** luminescent InP / ZnS (core/shell) quantum dots coated with hydrophobic organic ligands. Supplied as 5 mg/mL solution in toluene. QY > 80%, FWHM 40-45 nm.

### 520 ± 10 nm λ emission maximum

PL-QD-InP-520-05p-10mg	10 mg	160,00 EUR
PL-QD-InP-520-05p-50mg	50 mg	650,00 EUR
PL-QD-InP-520-05p-100mg	100 mg	1190,00 EUR

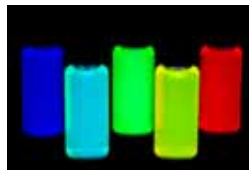
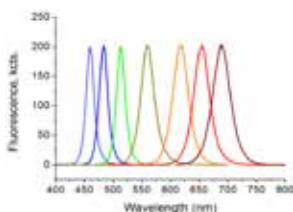
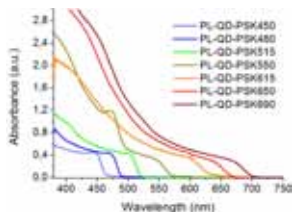
### 620 ± 10 nm λ emission maximum

PL-QD-InP-620-05p-10mg	10 mg	160,00 EUR
PL-QD-InP-620-05p-50mg	50 mg	650,00 EUR
PL-QD-InP-620-05p-100mg	100 mg	1190,00 EUR

## Perovskite Quantum Dots, cadmium free, hydrophobic

**Cd-free** strongly luminescent perovskite quantum dots of structure ABC<sub>3</sub> coated with hydrophobic organic ligands. Readily soluble in toluene, hexane, chlorobenzene and similar dry solvents. Not soluble in alcohols, ethers and other polar solvents. Avoid using water or water-containing solvents. Emission peak width (FWHM) ca. 15-35 nm. Particle size: ca. 10 nm.

Ideal for **industrial applications** due to the large scale manufacturing, and the **lowest prices among all available QDs**. For bulk quantities, please contact us at [info@plasmachem.com](mailto:info@plasmachem.com)



<b>450 ± 15 nm</b>	PL-QD-PSK-450-5mg	5 mg	30,00 EUR
	PL-QD-PSK-450-50mg	50 mg	160,00 EUR
	PL-QD-PSK-450-500mg	500 mg	450,00 EUR
<b>480 ± 15 nm</b>	PL-QD-PSK-480-5mg	5 mg	30,00 EUR
	PL-QD-PSK-480-50mg	50 mg	160,00 EUR
	PL-QD-PSK-480-500mg	500 mg	450,00 EUR
<b>510 ± 15 nm</b>	PL-QD-PSK-510-5mg	5 mg	30,00 EUR
	PL-QD-PSK-510-50mg	50 mg	160,00 EUR
	PL-QD-PSK-510-500mg	500 mg	450,00 EUR
<b>530 ± 15 nm</b>	PL-QD-PSK-530-5mg	5 mg	30,00 EUR
	PL-QD-PSK-530-50mg	50 mg	160,00 EUR
	PL-QD-PSK-530-500mg	500 mg	450,00 EUR
<b>550 ± 15 nm</b>	PL-QD-PSK-550-5mg	5 mg	30,00 EUR
	PL-QD-PSK-550-50mg	50 mg	160,00 EUR
	PL-QD-PSK-550-500mg	500 mg	450,00 EUR

## Quantum Dots Kits - hydrophilic

Get quantum dots of different colours at a reduced price.

### Hydrophilic CdTe Quantum Dots Kit

One kit of five types of quantum dots, 5 mg, 10 mg or 50 mg each type:  
Supplied as dry powder. Soluble in water.

Green -  $\lambda_{\text{emission max}}$  510-550 nm

Yellow -  $\lambda_{\text{emission max}}$  560-580 nm

Orange -  $\lambda_{\text{emission max}}$  590-620 nm

Red -  $\lambda_{\text{emission max}}$  630-650 nm

Ruby -  $\lambda_{\text{emission max}}$  660-700 nm

PL-QDN-Kit5	5 x 5 mg	179,00 EUR
PL-QDN-Kit10	5 x 10 mg	271,00 EUR
PL-QDN-Kit50	5 x 50 mg	1087,00 EUR

## Quantum Dots Kits - hydrophobic

Get quantum dots of different colours at a reduced price.

### Hydrophobic CdSe/ZnS Quantum Dots Kit

One kit of five types of quantum dots, 5 mg, 10 mg or 50 mg each type:  
Supplied as dry powder. Soluble in chloroform, toluene etc.

Blue -  $\lambda_{\text{emission max}}$  450-500 nm

Green -  $\lambda_{\text{emission max}}$  510-550 nm

Yellow -  $\lambda_{\text{emission max}}$  560-580 nm

Orange -  $\lambda_{\text{emission max}}$  590-620 nm

Red -  $\lambda_{\text{emission max}}$  630-650 nm

PL-QD-O-Kit5	5 x 5 mg	179,00 EUR
PL-QD-O-Kit10	5 x 10 mg	271,00 EUR
PL-QD-O-Kit50	5 x 50 mg	1087,00 EUR

### Hydrophobic Zn-Cu-In-S/ZnS Cd-free Quantum Dot Kit

One kit of four types of quantum dots, 10 mg, 25 mg or 100 mg each type:  
Supplied as dry powder. Soluble in hexane, toluene etc.

Green -  $\lambda_{\text{em.}}$  530 ± 20 nm

Yellow -  $\lambda_{\text{em.}}$  570 ± 20 nm

Orange -  $\lambda_{\text{em.}}$  610 ± 20 nm

Ruby -  $\lambda_{\text{em.}}$  670 ± 30 nm

PL-QD-CF-Kit10	4 x 10 mg	179,00 EUR
PL-QD-CF-Kit25	4 x 25 mg	277,00 EUR
PL-QD-CF-Kit100	4 x 100 mg	845,00 EUR

### Hydrophobic alloyed ZnCdSeS Quantum Dots Kit

One kit of five types of quantum dots, 10 mg, 25 mg or 100 mg each type:  
Supplied as dry powder. Soluble in hexane, toluene etc.

Blue -  $\lambda_{\text{em.}}$  470-480 nm

Cyan -  $\lambda_{\text{em.}}$  490-500 nm

Green -  $\lambda_{\text{em.}}$  510-550 nm

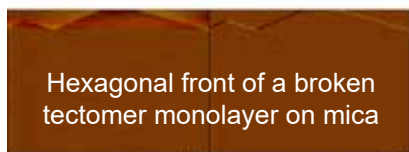
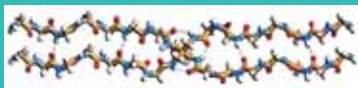
Yellow -  $\lambda_{\text{em.}}$  560-580 nm

Orange -  $\lambda_{\text{em.}}$  590-620 nm

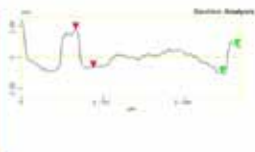
PL-QD-OA-Kit10	5 x 10 mg	239,00 EUR
PL-QD-OA-Kit25	5 x 25 mg	591,00 EUR
PL-QD-OA-Kit100	5 x 100 mg	1874,00 EUR

## Tectomers

Tectomers are a novel type of self-assembling molecules. The structure of a tectomer represents several oligoglycine units linked to one common center. The pH dependent formation of strong hydrogen bonds between molecules leads to their selfassembly into extra-regular 2-D or 3-D layers of monomolecular thickness. 10 mg of any tectomer is enough for coating of more than 2 m<sup>2</sup> of surface.

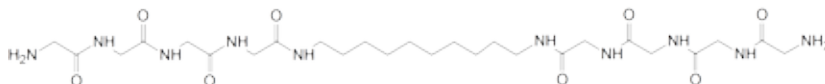


Hexagonal front of a broken tectomer monolayer on mica



### Tectomer 2-tailed, C<sub>8</sub>H<sub>16</sub>(-CH<sub>2</sub>-NH-Gly<sub>4</sub>)<sub>2</sub> \* 2 HCl

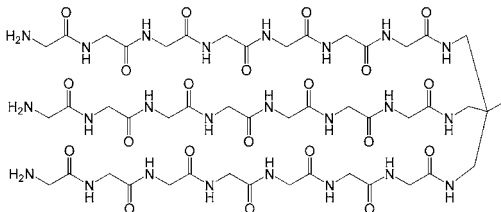
Purity: > 95%



PL-TEC-2-10mg	10 mg	84,00 EUR
PL-TEC-2-25mg	25 mg	179,00 EUR

### Tectomer 3-tailed, CH<sub>3</sub>C(-CH<sub>2</sub>-NH-Gly<sub>7</sub>)<sub>3</sub> \* 3 TFA

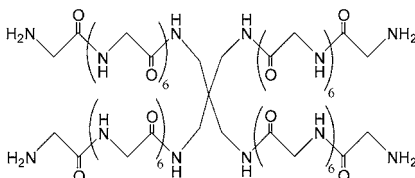
Purity: > 95%



PL-TEC-3-10mg	10 mg	84,00 EUR
PL-TEC-3-25mg	25 mg	179,00 EUR

### Tectomer 4-tailed, C(-CH<sub>2</sub>-NH-Gly<sub>7</sub>)<sub>4</sub> \* 4 HCl

Purity: > 95%



PL-TEC-4-10mg	10 mg	84,00 EUR
PL-TEC-4-25mg	25 mg	179,00 EUR

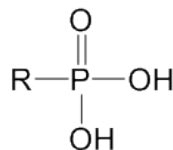
## Phosphonic Acids

Alkylphosphonic acids are widely used for production of nanoparticles such as quantum dots, nano-metals, nano-ceramics. By varying the carbohydral chain length one can change the particles' shape and size. Besides, they can be used for coating of many materials (including nanoparticles) by condensed hydrophobic monolayers.

### n-Alkylphosphonic acids kit

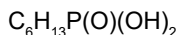
One kit of all seven n-Alkylphosphonic acids, 5 g. each:

- 1 x PL-HPA-5g
- 1 x PL-OPA-5g
- 1 x PL-DPA-5g
- 1 x PL-DDPA-5g
- 1 x PL-TDPA-5g
- 1 x PL-HDPA-5g
- 1 x PL-ODPA-5g



PL-PA-Kit	1 kit	650,00 EUR
-----------	-------	------------

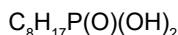
### n-Hexylphosphonic acid, tech.



Purity: > 97%  $T_m > 85^\circ\text{C}$   
White to off-white powder

PL-HPA-1g	1 g	40,00 EUR
PL-HPA-5g	5 g	149,00 EUR
PL-HPA-10g	10 g	202,00 EUR
PL-HPA-50g	50 g	698,00 EUR

### n-Octylphosphonic acid, tech.



Purity: > 97%  $T_m > 85^\circ\text{C}$   
White to off-white powder

PL-OPA-1g	1 g	40,00 EUR
PL-OPA-5g	5 g	149,00 EUR
PL-OPA-10g	10 g	202,00 EUR
PL-OPA-50g	50 g	698,00 EUR

### n-Decylphosphonic acid, tech.



Purity: > 97%  $T_m > 85^\circ\text{C}$   
White to off-white powder

PL-DPA-1g	1 g	29,00 EUR
PL-DPA-5g	5 g	109,00 EUR
PL-DPA-10g	10 g	145,00 EUR
PL-DPA-50g	50 g	508,00 EUR

### n-Dodecylphosphonic acid, tech.



Purity: > 97%  $T_m > 85^\circ\text{C}$   
White to off-white powder

PL-DDPA-1g	1 g	25,00 EUR
PL-DDPA-5g	5 g	91,00 EUR
PL-DDPA-10g	10 g	121,00 EUR
PL-DDPA-50g	50 g	424,00 EUR

## n-Tetradecylphosphonic acid, tech.

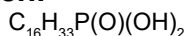


Purity: > 97%  $T_m > 85^\circ C$

White to off-white powder

PL-TDPA-1g	1 g	38,00 EUR
PL-TDPA-5g	5 g	145,00 EUR
PL-TDPA-10g	10 g	194,00 EUR
PL-TDPA-50g	50 g	678,00 EUR

## n-Hexadecylphosphonic acid, tech.

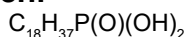


Purity: > 97%  $T_m > 85^\circ C$

White to off-white powder

PL-HDPA-1g	1 g	36,00 EUR
PL-HDPA-5g	5 g	136,00 EUR
PL-HDPA-10g	10 g	182,00 EUR
PL-HDPA-50g	50 g	635,00 EUR

## n-Octadecylphosphonic acid, tech.



Purity: > 97%  $T_m > 85^\circ C$

White to off-white powder

PL-ODPA-1g	1 g	48,00 EUR
PL-ODPA-5g	5 g	179,00 EUR
PL-ODPA-10g	10 g	239,00 EUR
PL-ODPA-50g	50 g	847,00 EUR

## Metal-Organic Frameworks (MOFs)

MOFs are crystalline compounds consisting of metal ions coordinated to organic molecules to form porous three-dimensional structures. Possible applications include storage of gases such as  $H_2$  and  $CO_2$ , gas purification / separation, in catalysis and as sensors.



### ZIF-8, 2-methylimidazole zinc salt

Large cavities (11.6 Å) connected by small windows (3.4 Å)

Specific surface: ca. 1600 m<sup>2</sup>/g; Empirical Formula  $C_8H_{10}N_4Zn$ ; Mw: 227,6

PL-MOF-ZIF8-1g	1 g	41,00 EUR
PL-MOF-ZIF8-10g	10 g	138,00 EUR
PL-MOF-ZIF8-100g	100 g	990,00 EUR

### ZIF-67, 2-methylimidazole cobalt salt

Large cavities (11.6 Å) connected by small windows (3.4 Å)

Specific surface: ca. 1500 m<sup>2</sup>/g; Empirical Formula  $C_8H_{10}N_4Co$ ; Mw: 221,1

PL-MOF-ZIF67-1g	1 g	41,00 EUR
PL-MOF-ZIF67-10g	10 g	138,00 EUR
PL-MOF-ZIF67-100g	100 g	990,00 EUR

## Latex beads, monodisperse

Latex beads are spherical monodisperse particles made of poly(methyl methacrylate) (PMMA), polystyrene (PS) or melamine formaldehyde (MF) as well as silica (SiO<sub>2</sub>) as base material. Surface modification and fluorescent labeling are performed during the preparation of the particles preventing the leaching of the dye and changing of their surface chemistry. For each size range the particles in pristine form (without surface modification), with surface carboxylic group or fluorescent label or both can be synthesized. Beads of a specific size range or fluorescence can be synthesized upon request, just let us know about your requirements.

Size 1 -	ca. 0,25 micron
Size 2 -	ca. 0,5 micron
Size 3 -	ca. 1 micron
Size 4 -	ca. 2 micron
Size 5 -	ca. 5 micron
Size 6 -	ca. 7 micron
Size 7 -	ca. 10 micron

### Size 1: ca. 0,25 µm

PMMA, pristine surface, not labeled; CV < 5%; 5 wt.% in water

PL-PMMA-1-5m	5 mL	150,00 EUR
PL-PMMA-1-10m	10 mL	200,00 EUR
PL-PMMA-1-20m	20 mL	300,00 EUR

PMMA, -COOH modified,  $\lambda_{ex}$  465 nm /  $\lambda_{em}$  480 nm; CV < 5%; 2,5 wt.% in water

PL-PMMA-1-CF5-5m	5 mL	350,00 EUR
PL-PMMA-1-CF5-10m	10 mL	480,00 EUR
PL-PMMA-1-CF5-20m	20 mL	600,00 EUR

PS, pristine surface, not labeled; CV < 5%; 5 wt.% in water

PL-PS-1-5m	5 mL	150,00 EUR
PL-PS-1-10m	10 mL	200,00 EUR
PL-PS-1-20m	20 mL	300,00 EUR

PS, -COOH modified, not labeled; CV < 5%; 5 wt.% in water

PL-PS-1-C-5m	5 mL	150,00 EUR
PL-PS-1-C-10m	10 mL	200,00 EUR
PL-PS-1-C-20m	20 mL	300,00 EUR

SiO<sub>2</sub>, not labeled; CV < 5%; 5 wt.% in water

PL-SiO2-1-B-1m	1 mL	59,00 EUR
PL-SiO2-1-B-5m	5 mL	229,00 EUR

## Size 3: ca. 1 $\mu\text{m}$

PMMA, -COOH modified, not labeled; CV < 5%; 5 wt.% in water

PL-PMMA-3-C-5m	5 mL	150,00 EUR
PL-PMMA-3-C-10m	10 mL	200,00 EUR
PL-PMMA-3-C-20m	20 mL	300,00 EUR

PS, pristine surface, not labeled; CV < 5%; 5 wt.% in water

PL-PS-3-5m	5 mL	150,00 EUR
PL-PS-3-10m	10 mL	200,00 EUR
PL-PS-3-20m	20 mL	300,00 EUR

SiO<sub>2</sub>, not labeled; CV < 5%; 5 wt.% in water

PL-SiO <sub>2</sub> -3-B-5m	5 mL	75,00 EUR
PL-SiO <sub>2</sub> -3-B-10m	10 mL	140,00 EUR
PL-SiO <sub>2</sub> -3-B-20m	20 mL	250,00 EUR

## Size 4: ca. 2 $\mu\text{m}$

PMMA, pristine surface, not labeled; CV < 5%; 5 wt.% in water

PL-PMMA-4-5m	5 mL	150,00 EUR
PL-PMMA-4-10m	10 mL	200,00 EUR
PL-PMMA-4-20m	20 mL	300,00 EUR

PS, pristine surface, not labeled; CV < 5%; 5 wt.% in water

PL-PS-4-5m	5 mL	150,00 EUR
PL-PS-4-10m	10 mL	200,00 EUR
PL-PS-4-20m	20 mL	300,00 EUR

MF, -NH<sub>2</sub> terminated, not labeled; CV < 5%; 5 wt.% in water

PL-MF-4-5m	5 mL	150,00 EUR
PL-MF-4-10m	10 mL	200,00 EUR
PL-MF-4-20m	20 mL	300,00 EUR

MF, -NH<sub>2</sub> terminated,  $\lambda_{\text{ex}}$  410 nm /  $\lambda_{\text{em}}$  515 nm; CV < 5%; 2,5 wt.% in water

PL-MF-4-G2-5m	5 mL	250,00 EUR
PL-MF-4-G2-10m	10 mL	350,00 EUR
PL-MF-4-G2-20m	20 mL	500,00 EUR

### Size 5: ca. 5 $\mu\text{m}$

PMMA, pristine surface, not labeled; CV < 5%; 5 wt.% in water

PL-PMMA-5-5m	5 mL	150,00 EUR
PL-PMMA-5-10m	10 mL	200,00 EUR
PL-PMMA-5-20m	20 mL	300,00 EUR

### Size 6: ca. 7 $\mu\text{m}$

PS, -COOH modified,  $\lambda_{\text{ex}}$  440 nm /  $\lambda_{\text{em}}$  475 nm; CV < 5%; 2,5 wt.% in water

PL-PS-6-CFG4-5m	5 mL	350,00 EUR
PL-PS-6-CFG4-10m	10 mL	480,00 EUR
PL-PS-6-CFG4-20m	20 mL	600,00 EUR

### Size 7: ca. 10 $\mu\text{m}$

PS, pristine surface, not labeled; CV < 5%; 5 wt.% in water

PL-PS-7-5m	5 mL	150,00 EUR
PL-PS-7-10m	10 mL	200,00 EUR
PL-PS-7-20m	20 mL	300,00 EUR

### Educational Exploitation Kit: Quantum Dots

A complete educational Exploration Kit containing:

- 5 types of water-soluble quantum dots  
of different colours (samples # a, b, c, e, g)
- 20 cuvettes
- 10 Pasteur pipettes
- 1 pocket UV-lamp

All you need to start the experiments  
with up to 10 groups of students.



You can download the lesson text, experiment description and worksheet online.  
Copying is allowed for educational purposes.

Warning: Not to be used by children without professional supervision!

QD-EDU-1	Complete Educational Kit	250,00 EUR
----------	--------------------------	------------

**Quantum dots.** Each sample is enough to prepare 2 mL stock solution or 50 mL final solution (enough for 25-50 samples)

QD-EDU-a	QD Sample #a (510-520 nm)	50,00 EUR
QD-EDU-b	QD Sample #b (530-540 nm)	50,00 EUR
QD-EDU-c	QD Sample #c (550 nm)	50,00 EUR
QD-EDU-d	QD Sample #d (560-570 nm)	50,00 EUR
QD-EDU-e	QD Sample #e (580-590 nm)	50,00 EUR
QD-EDU-f	QD Sample #f (600-610 nm)	50,00 EUR
QD-EDU-g	QD Sample #f (630-640 nm)	50,00 EUR
QD-EDU-h	QD Sample #f (650-690 nm)	50,00 EUR

#### Other consumables

QD-EDU-t	UV-Lamp, 1 pc	5,00 EUR
QD-EDU-q	Cuvettes, 100 pcs.	30,00 EUR
QD-EDU-p	Pasteur pipettes 1 mL, 100 pcs	20,00 EUR

You can check shipment prices and save time through instant ordering and payment at our online shop: <https://shop.plasmachem.com>

Order No.: \_\_\_\_\_

	Catalogue Number	Description	Amount
1.			
2.			
3.			
4.			
5.			
6.			

*Delivery Address:*

---



---



---



---



---



---

*Billing Address:*

---



---



---



---



---



---

Your notes:

---



---



---



---



---



---

Date: \_\_\_\_\_ Name: \_\_\_\_\_ Signature: \_\_\_\_\_

## **Terms and Conditions of Sale**

All sales are subject to the following terms and conditions: Limited Warranties

### **Limitation of Liability/Purchaser's Indemnity**

ALL ORDERS ARE ACCEPTED AND SHIPPED STRICTLY SUBJECT TO THESE GENERAL TERMS AND CONDITIONS AND NO OTHER TERMS AND CONDITIONS PRINTED ON BUYER'S PURCHASE ORDER OR OTHERWISE, SHALL BE APPLICABLE TO YOUR ORDER.

### **Method of Shipment**

Whenever possible, we will ship products by the method specified on your order. We work closely with Deutsche Post, FedEx, UPS, TNT, and DHL and find we can service you best when using these carriers. We will be happy to utilize other carriers based on your requirements; however, we must reserve the right to alter these instructions, in which case, we will select the most appropriate and cost effective method. Certain poisonous, reactive, corrosive or other chemicals may require a barrier bag, steel can, and/or other special packaging for shipment. There will be additional charges for these packages. Our Customer Service Representatives will advise you of the charges at the time the order is placed. We strive to minimize these costs through efficient packaging.

### **Terms and Prices**

All orders are shipped FOB seller's shipping point. Your order may be subject to handling charges. We can also ship freight collect, if desired. All prices are listed in euros. PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE. In cases where the selling prices have changed significantly, we will contact you for approval prior to shipping your mailed, faxed, or electronically-transferred order. OUR PAYMENT TERMS ARE NET 30 DAYS OF INVOICE, UNLESS OTHERWISE STATED. DELAYED PAYMENT IMPOSES A FINE of EUR 10.00 for the first reminder, which is sent after the payment deadline and EUR 20.00 for the second reminder, which is sent earliest 2 weeks after the first reminder.

### **Order Changes/Cancellations**

No change by Purchaser of any term or condition of this contract or any of Seller's rights

or remedies hereunder shall be binding on Seller, nor shall the order hereby acknowledged be changed or cancelled by Purchaser unless approved in writing by an authorized person of PlasmaChem GmbH. There are no representations, agreements, promises, or understandings between Purchaser and Seller that are not expressed herein.

### **Claims for Lost or Damaged Shipments**

We urge you to inspect all packages immediately upon receipt and report any damage, shortage or defect to our Customer Service Department as soon as possible. CLAIMS FOR THESE DISCREPANCIES MUST BE MADE WITHIN 30 DAYS OF YOUR RECEIVING THE MATERIALS. All products are sold FOB seller's shipping point unless otherwise noted. Delivery of goods to the carrier at seller's plant or to other loading point shall constitute delivery to Buyer, and regardless of shipping terms, all risks of loss or damage in transit shall be borne by Buyer.

### **Return Shipments**

Some materials are not returnable to PlasmaChem GmbH, including, but not limited to, custom or special order materials, leaking or damaged chemicals, items with missing or obliterated labels, parts or instructions, refrigerated or frozen materials and opened materials. Returned shipments cannot be accepted by PlasmaChem GmbH unless prior arrangements have been made. If it is necessary to return any materials, contact our representative to obtain a return authorization number. REQUESTS FOR RETURN AUTHORIZATION NUMBERS MUST BE MADE WITHIN 30 DAYS OF YOUR RECEIVING THE MATERIALS. Only items authorized by seller for return will be accepted. Final disposition of returned goods will be made only after receipt and inspection of goods. Collect shipments will not be accepted unless previously authorized. Material must be received on or before the Return Authorization expiration date. Material returned requiring disposal may incur additional charges. A 20% restocking fee is charged on catalogue items returned, subject to a minimum charge of EUR 20,00 and a maximum charge of EUR 150,00.

## **Uses and Patents**

Our materials are offered for laboratory and manufacturing use only. They are NOT intended for use as drugs, food additives, cosmetic, household chemicals, or other inappropriate applications. The listing of a material in this catalogue does not constitute a license to, or a recommendation for, its use in infringement of any patent. We reserve the right to limit sales of products or not to sell products to unqualified customers.

## **Limited Warranties**

The information included in this catalogue has been obtained from normally reliable and dependable sources and is correct to the best of our knowledge; however, we cannot guarantee it as such. WE MAKE NO OTHER REPRESENTATIONS OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, OR ANY OTHER MATTER WITH RESPECT TO OUR PRODUCTS, WHETHER USED ALONE OR IN CONNECTION WITH ANY OTHER SUBSTANCE.

## **Limited Liability/Purchaser's Indemnity**

Claims for rejected, non-conforming product, or any other claim against us, must be made in writing and must be received and acknowledged by us in writing within thirty (30) days of customer's receipt of the product in question. Any claims not satisfying this condition shall be deemed waived. Upon the approved return of any such product, we shall have the option to replace such product with conforming product or to return the purchase price to customer, at our sole discretion. PURCHASER'S EXCLUSIVE REMEDY, FOR ANY CAUSE OR CLAIM WHATSOEVER, INCLUDING BUT NOT LIMITED TO ALLEGED BREACH OF WARRANTY, PRODUCT LIABILITY, NEGLIGENCE, OR OTHERWISE, SHALL BE FOR MONEY DAMAGES IN AN AMOUNT NOT TO EXCEED THE PURCHASE PRICE PAID BY PURCHASER FOR THE PRODUCT IN RESPECT TO WHICH THE CLAIM IS MADE. IN NO EVENT SHALL WE BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, WHETHER PURCHASER'S CLAIM IN CONTRACT, NEGLIGENCE, STRICT LIABILITY

OR OTHERWISE. IN CONSIDERATION OF THE SALE OF PRODUCT TO PURCHASER, WHICH SALES WE WOULD NOT OTHERWISE MAKE, PURCHASER AGREES TO INDEMNIFY AND HOLD US HARMLESS FROM ALL CLAIMS, EXPENSES, LOSSES AND LIABILITY OF ANY NATURE WHATSOEVER ARISING OUT OF PURCHASER'S HANDLING AND/OR USE OF PRODUCT, WHETHER USED ALONE OR IN COMBINATION WITH ANY OTHER SUBSTANCE.

## **Material Safety Data Sheets**

Each shipment of chemicals and/or pure elements is accompanied by a Material Safety Data Sheet in compliance with OSHA Hazard Communication Standard. If one is not immediately available, a copy will be sent via mail as soon as possible. We strongly recommend that customers use this information to ensure proper use and that the health and safety of all are protected. We furnish the information on each Material Safety Data Sheet without warranty.

## **Hazards**

All of our products should be handled only by qualified and trained individuals. In purchasing these products, the customer acknowledges that there are hazards associated with their use. Customer represents and warrants to us that from customer's own independent review and study it is fully aware and knowledgeable about (a) the health and safety hazards associated with the handling of the products purchased; (b) industrial hygiene controls necessary to protect its workers from such health and safety hazards; (c) the need to adequately warn of health and safety hazards associated with products; and (d) government regulations regarding the use of and exposure to such products.

D.I. Mendeleev  
by Ilya Repin, 1885.  
The Tretyakov Gallery, Moscow, Russia)

PERIODIC TABLE OF THE ELEMENTS BY D.I. MENDELEEV																																																																										
I		II		III		IV		V		VI		VII		VII																																																												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28																																															
<b>H</b> Hydrogen 1,00794(7)	<b>Li</b> Lithium 6,941(2)	<b>Na</b> Sodium 22,98976928(2)	<b>Be</b> Beryllium 9,012182(3)	<b>B</b> Boron 10,811(7)	<b>C</b> Carbon 12,0107(8)	<b>N</b> Nitrogen 14,0067(2)	<b>O</b> Oxygen 15,9994(3)	<b>F</b> Fluorine 18,9984032(5)	<b>Ne</b> Neon 20,1797(6)	<b>Mg</b> Magnesium 24,3050(6)	<b>Al</b> Aluminum 26,9815386(8)	<b>Si</b> Silicon 28,0855(3)	<b>P</b> Phosphorus 30,973762(2)	<b>S</b> Sulfur 32,065(5)	<b>Cl</b> Chlorine 35,453(2)	<b>Ar</b> Argon 39,948(1)	<b>K</b> Potassium 39,0983(1)	<b>Ca</b> Calcium 40,078(4)	<b>Sc</b> Scandium 44,955912(6)	<b>Ti</b> Titanium 47,867(1)	<b>V</b> Vanadium 50,9415(1)	<b>Cr</b> Chromium 51,9961(6)	<b>Mn</b> Manganese 54,938045(2)	<b>Fe</b> Iron 55,845(2)	<b>Co</b> Cobalt 58,933195(5)	<b>Ni</b> Nickel 58,6934(4)	<b>Cu</b> Copper 63,546(3)	<b>Zn</b> Zinc 65,38(2)	<b>Ga</b> Gallium 69,723(1)	<b>Ge</b> Germanium 72,64(1)	<b>As</b> Arsenic 74,92160(2)	<b>Se</b> Selenium 78,96(3)	<b>Br</b> Bromine 79,904(1)	<b>Kr</b> Krypton 83,798(2)	<b>Rb</b> Rubidium 85,4678(3)	<b>Sr</b> Strontium 87,62(1)	<b>Y</b> Yttrium 88,90585(2)	<b>Zr</b> Zirconium 91,224(2)	<b>Nb</b> Niobium 92,90638(2)	<b>Mo</b> Molybdenum 95,96(2)	<b>Tc</b> Technetium [98]	<b>Ru</b> Ruthenium 101,07(2)	<b>Rh</b> Rhodium 102,90550(2)	<b>Pd</b> Palladium 106,42(1)	<b>Ag</b> Silver 107,8682(2)	<b>Cd</b> Cadmium 112,411(8)	<b>In</b> Indium 114,818(3)	<b>Sn</b> Tin 118,710(7)	<b>Sb</b> Antimony 121,760(1)	<b>Te</b> Tellurium 127,60(3)	<b>I</b> Iodine 126,90447(3)	<b>Xe</b> Xenon 131,293(6)	<b>Cs</b> Caesium 132,9054519(2)	<b>Ba</b> Barium 137,327(7)	<b>La</b> <sup>57</sup> Lanthanum 138,90547(7)	<b>Lu</b> <sup>71</sup> Lutetium 174,967(1)	<b>Hf</b> Hafnium 178,49(2)	<b>Ta</b> Tantalum 180,94788(2)	<b>Re</b> Rhenium 186,207(1)	<b>Os</b> Osmium 190,23(3)	<b>Ir</b> Iridium 192,2217(3)	<b>Pt</b> Platinum 195,084(9)	<b>Au</b> Gold 196,966569(4)	<b>Hg</b> Mercury 200,59(2)	<b>Tl</b> Thallium 204,3833(2)	<b>Pb</b> Lead 207,2(1)	<b>Bi</b> Bismuth 208,98040(1)	<b>Po</b> Polonium [209]	<b>At</b> Astatine [210]	<b>Rn</b> Radon [222]	<b>Fr</b> Francium [223]	<b>Ra</b> Radium [226]	<b>Ac</b> <sup>89</sup> Actinium [227]	<b>Lr</b> <sup>103</sup> Lawrencium [262]

LANTHANIDE SERIES

<b>La</b> <sup>57</sup> Lanthanum 138,90547(7)	<b>Ce</b> <sup>58</sup> Cerium 140,116(1)	<b>Pr</b> <sup>59</sup> Praseodymium 140,90765(2)	<b>Nd</b> <sup>60</sup> Neodymium 144,242(3)	<b>Pm</b> <sup>61</sup> Promethium [145]	<b>Sm</b> <sup>62</sup> Samarium 150,36(2)	<b>Eu</b> <sup>63</sup> Europium 151,964(1)	<b>Gd</b> <sup>64</sup> Gadolinium 157,25(3)	<b>Tb</b> <sup>65</sup> Terbium 158,92535(2)	<b>Dy</b> <sup>66</sup> Dysprosium 162,500(1)	<b>Ho</b> <sup>67</sup> Holmium 164,93032(2)	<b>Er</b> <sup>68</sup> Erbium 167,255(3)	<b>Tm</b> <sup>69</sup> Thulium 168,93421(2)	<b>Yb</b> <sup>70</sup> Ytterbium 173,054(5)	<b>Lu</b> <sup>71</sup> Lutetium 174,9668(1)
--	---	---	--	--	--	---	--	--	---	--	---	--	--	--

ACTINIDE SERIES

<b>Ac</b> <sup>89</sup> Actinium [227]	<b>Th</b> <sup>90</sup> Thorium 232,03806(6)	<b>Pa</b> <sup>91</sup> Protactinium 231,03688(2)	<b>U</b> <sup>92</sup> Uranium 238,02891(3)	<b>Np</b> <sup>93</sup> Neptunium [237]	<b>Pu</b> <sup>94</sup> Plutonium [244]	<b>Am</b> <sup>95</sup> Americium [243]	<b>Cm</b> <sup>96</sup> Curium [247]	<b>Bk</b> <sup>97</sup> Berkelium [247]	<b>Cf</b> <sup>98</sup> Californium [251]	<b>Es</b> <sup>99</sup> Einsteinium [252]	<b>Fm</b> <sup>100</sup> Fermium [257]	<b>Md</b> <sup>101</sup> Mendelevium [258]	<b>No</b> <sup>102</sup> Nobelium [259]	<b>Lr</b> <sup>103</sup> Lawrencium [262]
--	--	---	---	---	---	---	--	---	---	---	--	--	---	---