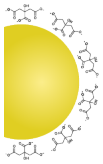
CYTODIAGNOSTICS

PRODUCT DATA SHEET

Silver Nanoparticles, >99% Reactant Free

Catalog Numbers: SRF-10-XX, SRF-20-XX, SRF-30-XX, SRF-40-XX, SRF-50-XX, SRF-60-XX, SRF-80-XX, SRF-100-XX



Citrate Capped

Description

Cytodiagnostics silver nanoparticles are an ideal alternative to gold nanoparticles due to their absorption maximum in the 400nm range; instead of 500nm for gold nanoparticles. Silver nanoparticles retain the same protein and other ligand binding properties of gold nanoparticles.

Our silver nanoparticles are available in 8 different sizes ranging from 10-100nm, and are synthesized using a unique protocol. Our synthesis method produces monodisperse particles with a narrow and uniform size distribution (CV<15%).

For custom sizes, formulations or bulk quantities please contact our customer service department.

Features

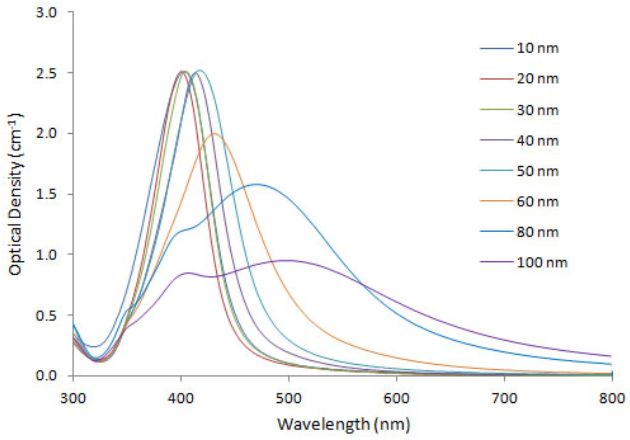
- Absorption maximum in the 400nm range.
- Readily bind proteins and other ligands for conjugate and sensor development.
- Unagglomerated monodisperse particles.
- Also available with multiple surface functionalities to suit all your needs. (Please see Cytodiagnostics PEGylated and Functionalized Silver Nanoparticles)

Applications

- Ideal for development of peptide and protein silver conjugates for use in applications such as blotting, lateral flow assays, LSPR assays, SERS, light microscopy, dark field and transmission electron microscopy (TEM).

Characteristics

Core diameter: 10-100nm (Coefficient of Variance < 15%)
Polydispersity Index (PDI): < 0.20
Concentration: ~ 0.02 mg/ml)
Absorbance (λmax): 390-490nm
Supplied in 2mM Sodium Citrate



Protein Conjugation

A recommended starting protocol for conjugation of proteins to Cytodiagnostics silver nanoparticles can be found online at www.cytodiagnostics.com in the Technical Reference Section.

Storage

This product should be stored at 4°C in the dark. DO NOT FREEZE. If stored unopened and as specified, Cytodiagnostics silver nanoparticles are stable for at least 6 months.

Handling

When stored for a long period of time silver nanoparticles may sediment at the bottom of the flask, which is especially true for larger particle sizes. Prior to use, re-suspend the sedimented particles by swirling until a homogenous solution is obtained.

To maintain optimal performance, and stability of the colloidal silver, care should be taken to use clean storage containers if using other than supplied with the product.

Canada, Europe, Asia, Pacific and Africa
919 Fraser Drive, Unit 11, Burlington, ON Canada L7L 4X8
Tel: 866-344-3954 Fax: 289-204-9100
www.cytodiagnostics.com

United States, Mexico, South and Central America
5867 South Garnett Road, Tulsa, Oklahoma 74146 USA
Tel: 866-344-3954 Fax: 289-204-9100
www.cytodiagnostics-us.com

CYTODIAGNOSTICS

Diameter (nm)	Peak SPR Wavelength (nm)	NPS/ml	Wt. Conc. (mg/ml)	Size Dispersity (+/-nm)	Particle Volume (nm^3)	Surface Area (nm^2)	Surface/ Volume Ratio	Particle Mass (g)	Molar Mass (g/mol)	Molar Conc.
10	390-405	~3.6E+12	2.00E-02	<18%	5.24E+02	3.14E+02	0.6	5.49E-18	3.31E+06	5.98E-09
20	390-410	~4.6E+11	2.00E-02	<15%	4.19E+03	1.26E+03	0.3	4.39E-17	2.65E+07	7.64E-10
30	400-410	~1.4E+11	2.00E-02	<15%	1.41E+04	2.83E+03	0.2	1.48E-16	8.93E+07	2.32E-10
40	405-425	~5.7E+10	2.00E-02	<15%	3.35E+04	5.03E+03	0.15	3.52E-16	2.12E+08	9.47E-11
50	410-430	~2.9E+10	2.00E-02	<12%	6.54E+04	7.85E+03	0.12	6.87E-16	4.13E+08	4.28E-11
60	425-450	~1.7E+10	2.00E-02	<12%	1.13E+05	1.13E+04	0.1	1.19E-15	7.14E+08	2.82E-11
80	440-480	~7.1E+09	2.00E-02	<12%	2.68E+05	2.01E+04	0.075	2.81E-15	1.69E+09	1.18E-11
100	480-520	~3.6E+09	2.00E-02	<10%	5.24E+05	3.14E+04	0.06	5.49E-15	3.31E+09	5.98E-12

Washing Silver Nanoparticles

Although it is not generally necessary to wash the silver nanoparticles prior to use, some applications may require additional washing procedures. Silver ions released from the silver nanoparticle surface may affect some applications. The easiest way to remove possible contaminants in the nanoparticle solution is by centrifugation. Centrifugation force is dependent on size of the silver nanoparticles and should be adjusted according to Table I for optimal performance.

Note I: Since non-functionalized silver nanoparticles are sensitive to salt containing buffers, re-suspension should always be performed in ultra-pure water to prevent irreversible aggregation. Irreversible aggregation is characterized by a drop in optical density and a shift in colour.

Note II: Please note that centrifugation can induce aggregation. To prevent aggregation, it may be necessary to add Tween 20 at a concentration of 0.025% w/v.

Procedure

1. Place 1ml aliquot of colloidal silver in a 1.5ml micro centrifuge tube.
2. Centrifuge the silver nanoparticles for 30 minutes using the appropriate G force determined by referencing Table I.
3. Remove the supernatant and re-suspend in an appropriate volume of ultra-pure water, or 2mM sodium citrate solution
4. Vortex to re-disperse the particles.

Table I. Appropriate G forces for centrifugation of silver nanoparticles. Note that recommended conditions are for a volume of 1ml and centrifugation using a microcentrifuge.

Size (nm)	Speed (*g*)	Time (min)
10*	21,000	60 (~50% recovery)
20	17,000	30
30	11,000	30
40	3,000	30
50	1,800	30
60	900	30
80	500	30
80	600	30
100	300	30

*For 10nm silver nanoparticles, recovery was about 50% at the specified condition. For better recovery, 1) use an ultracentrifuge to achieve higher G force; 2) use a Centricon Spin Column.

Product Safety and Handling

This product is for R&D use only, not for drug, household, or other uses. Please review the material safety datasheet (MSDS) available online for proper safety and handling procedures.

Canada, Europe, Asia, Pacific and Africa
919 Fraser Drive, Unit 11, Burlington, ON Canada L7L 4X8
Tel: 866-344-3954 Fax: 289-204-9100
www.cytodiagnostics.com

United States, Mexico, South and Central America
5867 South Garnett Road, Tulsa, Oklahoma 74146 USA
Tel: 866-344-3954 Fax: 289-204-9100
www.cytodiagnostics-us.com

CYTO DIAGNOSTICS

Catalog Number	Description	Sizes
SRF-10-XX	10nm Reactant Free Silver Nanoparticles	20ml, 100ml, 500ml, or 1000ml
SRF-20-XX	20nm Reactant Free Silver Nanoparticles	20ml, 100ml, 500ml, or 1000ml
SRF-30-XX	30nm Reactant Free Silver Nanoparticles	20ml, 100ml, 500ml, or 1000ml
SRF-40-XX	40nm Reactant Free Silver Nanoparticles	20ml, 100ml, 500ml, or 1000ml
SRF-50-XX	50nm Reactant Free Silver Nanoparticles	20ml, 100ml, 500ml, or 1000ml
SRF-60-XX	60nm Reactant Free Silver Nanoparticles	20ml, 100ml, 500ml, or 1000ml
SRF-80-XX	80nm Reactant Free Silver Nanoparticles	20ml, 100ml, 500ml, or 1000ml
SRF-100-XX	100nm Reactant Free Silver Nanoparticles	20ml, 100ml, 500ml, or 1000ml

*Indicates quantity, e.g. SRF-10-20 for 20ml of 10nm Reactant Free Silver Nanoparticles

For bulk quantities, and custom silver nanoparticle surface chemistry, please contact our customer service department.

Ordering Information

For ordering call 866-344-3954 or visit us online.

Canada, Europe, Asia, Pacific and Africa
919 Fraser Drive, Unit 11, Burlington, ON Canada L7L 4X8
Tel: 866-344-3954 Fax: 289-204-9100
www.cytodiagnostics.com

United States, Mexico, South and Central America
5867 South Garnett Road, Tulsa, Oklahoma 74146 USA
Tel: 866-344-3954 Fax: 289-204-9100
www.cytodiagnostics-us.com