Gold NanoUrchins, Reactant-Free

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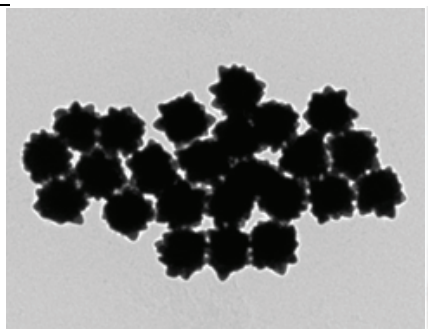
Gold NanoUrchins

Catalog #	Description
79-0310	(50nm diameter, 1 OD, 0.1 mM in phosphate-buffered saline, 585nm abs. max.) >95.0% reactant free
79-0313	(60nm diameter, 1 OD, 0.1 mM in phosphate-buffered saline, 585nm abs. max.) >95.0% reactant free
79-0315	(70nm diameter, 1 OD, 0.1 mM in phosphate-buffered saline, 600nm abs. max.) >95.0% reactant free
79-0318	(80nm diameter, 1 OD, 0.1 mM in phosphate-buffered saline, 620nm abs. max.) >95.0% reactant free
79-0320	(90nm diameter, 1 OD, 0.1 mM in phosphate-buffered saline, 630nm abs. max.) >95.0% reactant free
79-0323	(100nm diameter, 1 OD, 0.1 mM in phosphate-buffered saline, 680nm abs. max.) >95.0% reactant free



Available in 20ml and 100ml sizes

Diameter (nm)	Peak SPR Wavelength (nm)	NPS/ml	Wt. Conc. (mg/ml)	Molar Ext ($M^{-1}cm^{-1}$)	Size Dispersity (+/-nm)	Particle Volume (nm^3) *	Surface Area (nm^2) *	Surface/ Volume Ratio *	Particle Mass (g)	Molar Mass (g/mol)	Molar Conc.
50	585	3.51E+10	4.45E-02	1.72E+10	<8%	6.54E+04	7.85E+03	0.12	1.27E-15	7.64E+08	5.83E-11
60	585	1.96E+10	4.30E-02	3.07E+10	<10%	1.13E+05	1.13E+04	0.1	2.19E-15	1.32E+09	3.25E-11
70	600	1.20E+10	4.17E-02	5.03E+10	<10%	1.80E+05	1.54E+04	0.086	3.48E-15	2.10E+09	1.99E-11
80	620	7.82E+09	4.06E-02	7.70E+10	<10%	2.68E+05	2.01E+04	0.075	5.20E-15	3.13E+09	1.30E-11
90	630	5.37E+09	3.97E-02	1.12E+11	<8%	3.82E+05	2.54E+04	0.067	7.40E-15	4.46E+09	8.92E-12
100	680	3.84E+09	3.89E-02	1.57E+11	<8%	5.24E+05	3.14E+04	0.06	1.02E-14	6.11E+09	6.37E-12

* Data is approximated based upon a spherical nanoparticle.

Description

Non-functionalized Gold NanoUrchins have unique optical properties compared to spherical gold nanoparticles of the same core diameter. The spiky uneven surface causes a red shift in the surface plasmon peak and a larger enhancement of electromagnetic fields at the tips of the Gold NanoUrchin spikes compared to that of a spherical particles. As an example, 100nm spherical gold nanoparticles have an SPR peak at 570nm while 100nm Gold NanoUrchins have a SPR peak at around 680nm. In addition, binding of ligands such as proteins to the Gold NanoUrchin surface causes a larger shift in the surface plasmon peak compared to standard spherical gold nanoparticles.

The citrate-covered surface of our Gold NanoUrchins allows for efficient adsorption of primary antibodies and other proteins. In addition, Gold NanoUrchins can be further modified and functionalized through ligand-exchange with e.g. thiol-containing ligands such as PEG and oligonucleotides. These particles can be used as an alternative to standard spherical gold nanoparticles in a wide range of applications such as electron microscopy, immunostaining and development of biological sensors.

Our Gold NanoUrchins are available in 6 different sizes and have uniform size distribution (CV <12%).

Features

- Enhanced optical properties
- Citrate surface allows for easy ligand-exchange for further functionalization
- Readily adsorbs proteins to the surface

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Characteristics

Core diameter:	50nm-100nm (Coefficient of Variance < 12%)
Polydispersity Index (PDI):	< 0.2
Concentration:	OD=1
Absorbance (λmax):	585nm-680nm (core diameter dependant)

Supplied in 0.1mM Phosphate-Buffered Saline

Preparation of the gold nanoparticle conjugate:

1. Transfer amount of gold nanoparticles needed for your application from the stock to a new tube.
2. Add protein amount as determined above plus an additional 10%.
3. Incubate for 30 minutes at room temperature while stirring.
4. Centrifuge the solution for 30 minutes at the appropriate speed for the gold nanoparticle size used. (See Table I.)
5. Resuspend the pellet in PBS supplemented with 0.1% BSA or 1% PEG.
6. Store at 4°C until use.

Table I. Appropriate G forces for centrifugation of gold nanoparticles. Note that recommended conditions are for a volume of 1ml and centrifugation using a microcentrifuge, except for 5nm gold nanoparticles that requires an ultracentrifuge.

Size (nm)	Speed (*g*)	Time (min)
5	100,000	30
10	17,000	60 (~50% recovery)
15	17,000	30
20	6,500	30
30	4,500	30
40	2,500	30
50	2,000	30
60	1,125	30
80	600	30
100	400	30
150	180	30
200	100	30

References:

Thobhani, S., Atree, S., Boyd, R., Kumarswami, N., Noble, J., Szymanski, M., Porter, R.A. (2010)
Bioconjugation and characterization of gold colloid-labelled proteins *Journal of Immunological Methods* 356, 60-69

Storage/Stability

This product should be stored at 4°C. Do not freeze. If stored as specified, Gold NanoUrchins are stable for at least 6 months.

Precautions and Disclaimer

These products are for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet available online at www.strem.com for information regarding hazards and safe handling procedures.

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