



# Silica-coated Gold NanoSpheres

## Sample Tech Spec Sheets

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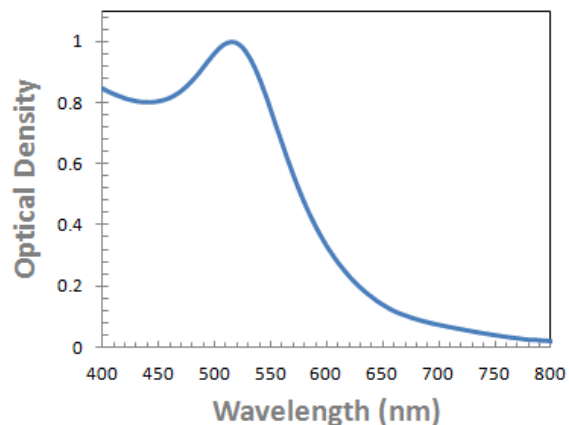


## Silica-coated Gold NanoSpheres

### 5 nm Gold NanoSpheres, Silica coating

	Product Specs	Lot-specific
Diameter	4-6 nm	5.7 ± 0.6 nm
SPR peak	512-522 nm	514 nm
Particle concentration (per mL) for OD = 1	6.3 – 6.9 × 10 <sup>13</sup>	6.6 × 10 <sup>13</sup>
Mass concentration - Au (mg/mL) for OD = 1	0.075 – 0.09	0.084
Particle Molar Concentration (M) for OD = 1	1.0 – 1.2 × 10 <sup>-7</sup>	1.1 × 10 <sup>-7</sup>
Silica thickness	9 - 13 nm	13.0 ± 1.7 nm
Zeta potential	< -15 mV	-16.4 mV
pH	7.5 – 9.5	7.9
Particle surface	Silica	
Solvent	DIUF Water	

Extinction Spectrum



Hydroxyl = Bare silica surface, hydroxyl termination

SPR = Surface Plasmon Resonance

DIUF = Deionized and ultrafiltrated water (18.1 MΩ-cm)

OD = Optical Density (using a 1 cm path length cuvette)

## Product Numbers

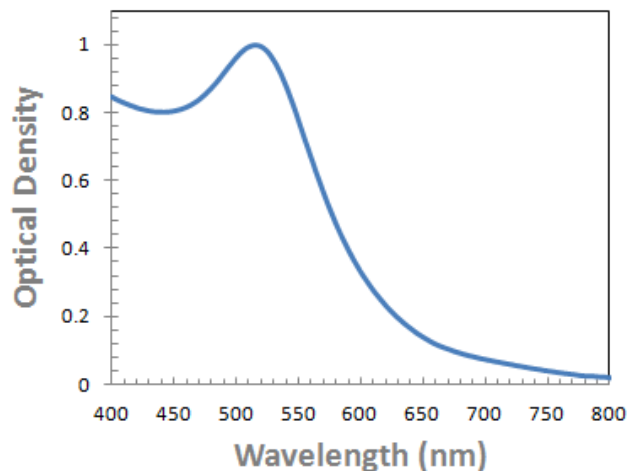
Coating	Termination	OD	Volume	5 nm
Silica	Hydroxyl	OD = 1	10 mL	92318-L010ML
			2.5 mL	92318-L2.5ML
		OD = 100	1 mL	92318-H001ML
			250 µL	92318-H250UL

## Silica-coated Gold NanoSpheres

### 5 nm Gold NanoSpheres, Silica + PEG coating

	Product Specs	Lot-specific
Diameter	4-6 nm	5.2 ± 0.8 nm
SPR peak	512-522 nm	515 nm
Particle concentration (per mL) for OD = 1	6.3 – 6.9 x 10 <sup>13</sup>	6.6 x 10 <sup>13</sup>
Mass concentration - Au (mg/mL) for OD = 1	0.075 – 0.09	0.084
Particle Molar Concentration for OD = 1 (M)	1.0 – 1.2 x 10 <sup>-7</sup>	1.1 x 10 <sup>-7</sup>
Silica thickness	9 - 13 nm	12.4 ± 1.6 nm
Zeta potential	-5 ± 5 mV	-2.3 mV
pH	6 – 8	6.9
Particle surface	PEG	
Solvent	DIUF Water	

Extinction Spectrum



PEG = Polyethylene glycol (5 kDa), grafted to the silica surface

SPR = Surface Plasmon Resonance

DIUF = Deionized and ultrafiltrated water (18.1 MΩ-cm)

OD = Optical Density (using a 1 cm path length cuvette)

### Product Numbers

Coating	Termination	OD	Volume	5 nm
Silica + PEG	PEG	OD = 1	10 mL	44916-L010ML
			2.5 mL	44916-L2.5ML
		OD = 100	1 mL	44916-H001ML
			250 µL	44916-H250UL

NanoHybrids warrants that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. Purchaser must determine the suitability of the product for their particular use.

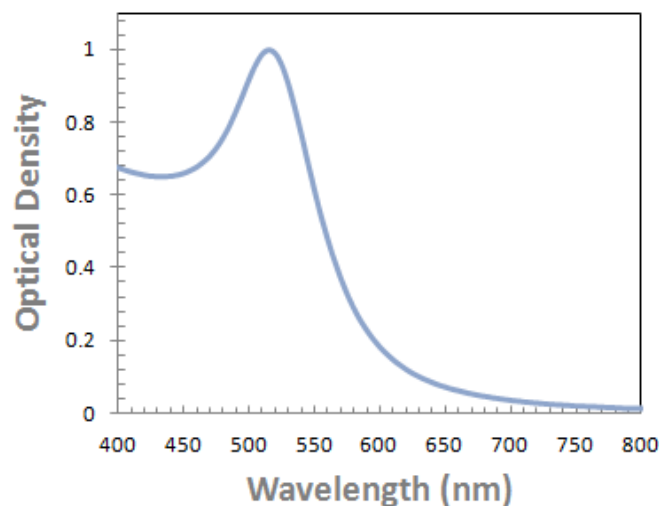
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## Silica-coated Gold NanoSpheres

### 10 nm Gold NanoSpheres, Silica coating

	Product Specs	Lot-specific
Diameter	9-12 nm	10.7 ± 0.6 nm
SPR peak	514-524 nm	522 nm
Particle concentration (per mL) for OD = 1	6.2 – 6.8 × 10 <sup>12</sup>	6.8 × 10 <sup>12</sup>
Mass concentration - Au (mg/mL) for OD = 1	0.06 – 0.07	0.063
Particle Molar Concentration (M) for OD = 1	1.0 – 1.2 × 10 <sup>-8</sup>	1.19 × 10 <sup>-8</sup>
Silica thickness	18 - 22 nm	19.3 ± 1.7 nm
Zeta potential	< -15 mV	- 38.1 mV
pH	7.5 – 9.5	8.27
Particle surface	Silica	
Solvent	DIUF Water	

Extinction Spectrum



Hydroxyl = Bare silica surface, hydroxyl termination

SPR = Surface Plasmon Resonance

DIUF = Deionized and ultrafiltrated water (18.1 MΩ-cm)

OD = Optical Density (using a 1 cm path length cuvette)

### Product Numbers

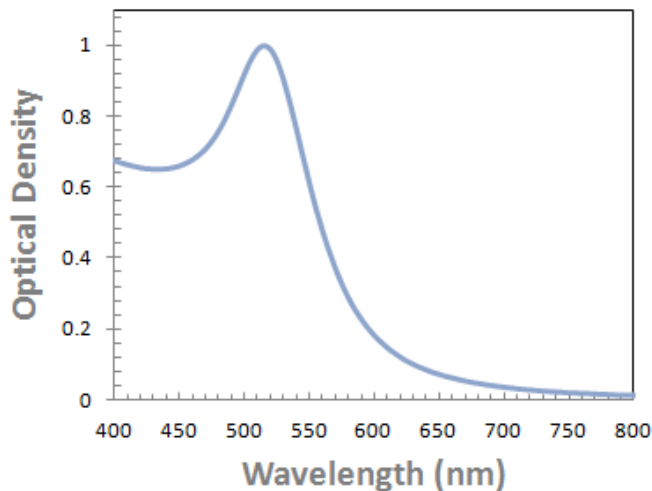
Coating	Termination	OD	Volume	10 nm
Silica	Hydroxyl	OD = 1	10 mL	79018-L010ML
			2.5 mL	79018-L2.5ML
		OD = 100	1 mL	79018-H001ML
			250 µL	79018-H250UL

## Silica-coated Gold NanoSpheres

### 10 nm, Gold NanoSpheres, Silica + PEG coating

	Product Specs	Lot-specific
Diameter	8-12 nm	11.2 ± 1.3 nm
SPR peak	514-524 nm	518 nm
Particle concentration (per mL) for OD = 1	6.2 – 6.8 x 10 <sup>12</sup>	6.8 x 10 <sup>12</sup>
Mass concentration - Au (mg/mL) for OD = 1	0.055 – 0.07	0.063
Particle Molar Concentration (M) for OD = 1	1.0 – 1.2 x 10 <sup>-8</sup>	1.19 x 10 <sup>-8</sup>
Silica thickness	18 - 22 nm	20.6 ± 1.1 nm
Zeta potential	-5 ± 5 mV	-2.7 mV
pH	6 – 8	7.1
Particle surface	PEG	
Solvent	DIUF Water	

Extinction Spectrum



PEG = Polyethylene glycol (5 kDa), grafted to the silica surface

SPR = Surface Plasmon Resonance

DIUF = Deionized and ultrafiltrated water (18.1 MΩ-cm)

OD = Optical Density (using a 1 cm path length cuvette)

### Product Numbers

Coating	Termination	OD	Volume	10 nm
Silica + PEG	PEG	OD = 1	10 mL	88748-L010ML
			2.5 mL	88748-L2.5ML
		OD = 100	1 mL	88748-H001ML
			250 µL	88748-H250UL

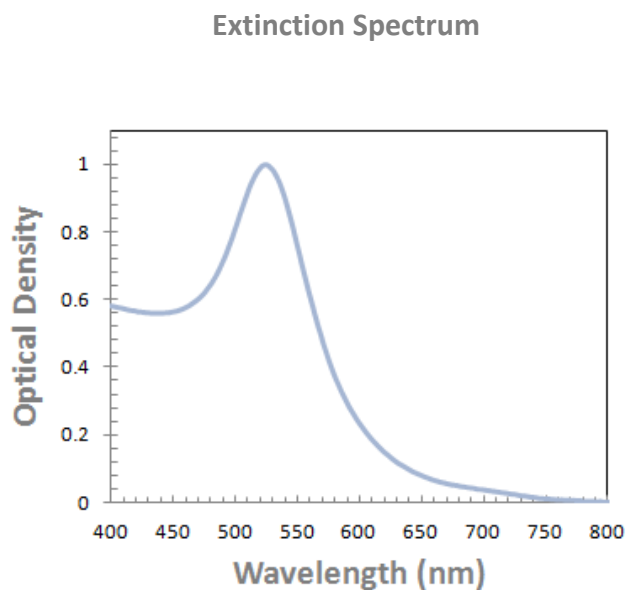
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## Silica-coated Gold NanoSpheres

### 20 nm Gold NanoSpheres, Silica coating

	Product Specs	Lot-specific
Diameter	17-23 nm	18.6 ± 1.7 nm
SPR peak	518-528 nm	526 nm
Particle concentration (per mL) for OD = 1	8.5 – 9.0 x 10 <sup>11</sup>	8.7 x 10 <sup>11</sup>
Mass concentration - Au (mg/mL) for OD = 1	0.05 – 0.06	0.055
Particle Molar Concentration (M) for OD = 1	1.0 – 1.2 x 10 <sup>-9</sup>	1.08 x 10 <sup>-9</sup>
Silica thickness	18 - 22 nm	18.4 ± 1.2 nm
Zeta potential	< -15 mV	- 30.8 mV
pH	7.5 – 9.5	8.10
Particle surface	Silica	
Solvent	DIUF Water	



Hydroxyl = Bare silica surface, hydroxyl termination

SPR = Surface Plasmon Resonance

DIUF = Deionized and ultrafiltrated water (18.1 MΩ-cm)

OD = Optical Density (using a 1 cm path length cuvette)

### Product Numbers

Coating	Termination	OD	Volume	20 nm
Silica	Hydroxyl	OD = 1	10 mL	11547-L010ML
			2.5 mL	11547-L2.5ML
		OD = 100	1 mL	11547-H001ML
			250 µL	11547-H250UL

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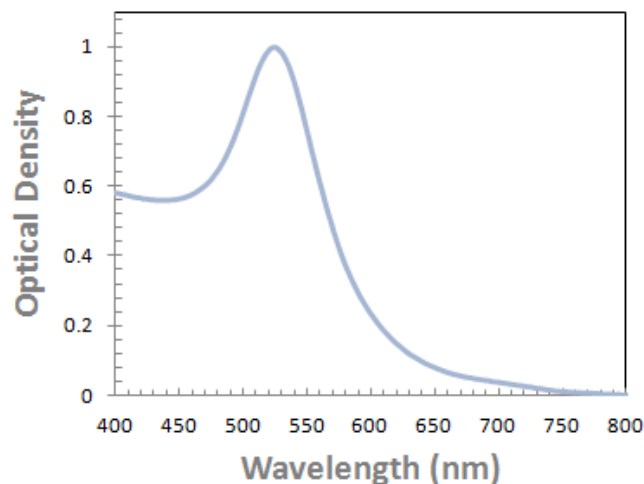
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## Silica-coated Gold NanoSpheres

### 20 nm Gold NanoSpheres, Silica + PEG coating

	Product Specs	Lot-specific
Diameter	17-23 nm	18.4 ± 1.2 nm
SPR peak	518-528 nm	521 nm
Particle concentration (per mL) for OD = 1	6.1 – 6.7 x 10 <sup>11</sup>	6.7 x 10 <sup>11</sup>
Mass concentration - Au (mg/mL) for OD = 1	0.045 – 0.06	0.055
Particle Molar Concentration (M) for OD = 1	1.0 – 1.2 x 10 <sup>-9</sup>	1.08 x 10 <sup>-9</sup>
Silica thickness	18 - 22 nm	20.3 ± 1.5 nm
Zeta potential	-5 ± 5 mV	-3.6 mV
pH	6 – 8	7.4
Particle surface	PEG	
Solvent	DIUF Water	

Extinction Spectrum



PEG = Polyethylene glycol (5 kDa), grafted to the silica surface

SPR = Surface Plasmon Resonance

DIUF = Deionized and ultrafiltrated water (18.1 MΩ-cm)

OD = Optical Density (using a 1 cm path length cuvette)

### Product Numbers

Coating	Termination	OD	Volume	20 nm
Silica + PEG	PEG	OD = 1	10 mL	79313-L010ML
			2.5 mL	79313-L2.5ML
		OD = 100	1 mL	79313-H001ML
			250 µL	79313-H250UL

# Silica-coated Gold NanoSpheres

## Storage and Handling Procedures

**Store at 2-8 °C away from light.** Storage at low temperature increases shelf life and stability of the nanoparticles, preventing changes in shape and/or size. Short term exposure to light and room temperature is acceptable.

**DO NOT FREEZE.** Freezing will induce irreversible aggregation of particles and destroy the product.

**Store bare silica-coated particles at elevated pH to prevent aggregation.** The hydroxyl-terminated surface is more stable at higher pH. Refer to the chart below for dispersion stability. When switching pH or media, filter the new dispersion with a  $\leq 0.45 \mu\text{m}$  filter to remove aggregates. Measure the extinction spectrum on a spectrophotometer to determine the new optical density (OD).

Medium	pH Required for > 60% Dispersal	pH Required for > 90% Dispersal
Water	> 6.8 pH	> 8.2 pH
HEPES	> 6.5 pH	> 7.8 pH
PBS	> 8.3 pH	> 9.4 pH

**Bring to room temperature and shake well before each use.** Particles may settle to the bottom over time. Shake vigorously for 30 seconds to ensure particles are fully dispersed before use. Visually inspect to ensure all product has redispersed. If particulates or plating remain, sonicate for 15 seconds, shake, and repeat as necessary. Do not sonicate for periods longer than 15 seconds.

**Quality Control.** If there are visible particulates or a change in the color or intensity of the dispersion, the nanoparticles may have aggregated. Filter the solution using a  $\leq 0.45 \mu\text{m}$  filter polyvinylidene fluoride and save the filtered product. Check quality with spectrophotometry and electron microscopy.