



# Functionalized Gold NanoSpheres

## Sample Tech Spec Sheets

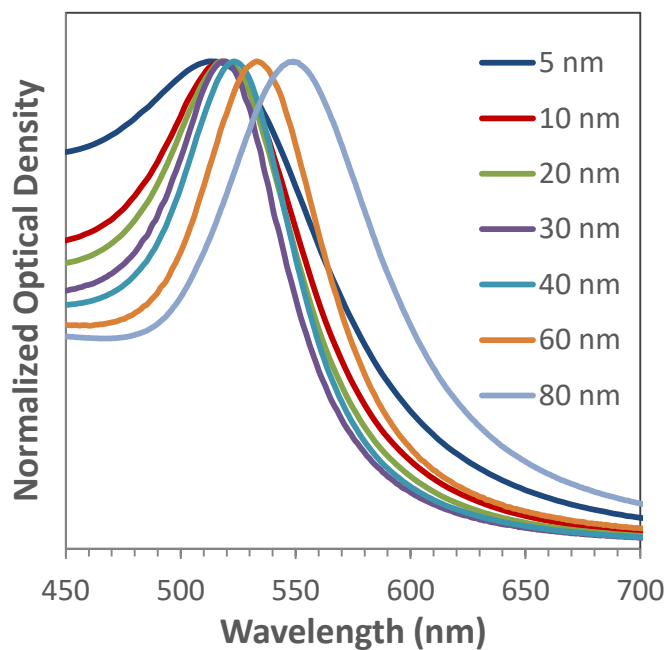
### *Amine*

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## Specification Overview of Gold NanoSphere, PEGylated, Amine Terminated

	5 nm Gold NanoSpheres	10 nm Gold NanoSpheres	20 nm Gold NanoSpheres	30 nm Gold NanoSpheres	40 nm Gold NanoSpheres	60 nm Gold NanoSpheres	80 nm Gold NanoSpheres
Diameter	4 – 6 nm	9 – 13 nm	20 ± 1.5 nm	20 ± 1.5 nm	40 ± 1.5 nm	60 ± 1.5 nm	80 ± 1.5 nm
Diameter Deviation	< 1.5 nm	< 1.5 nm	< 2.5 nm	< 3.0 nm	< 4.0 nm	< 4.8 nm	< 6.4 nm
Coefficient of Variation [Deviation ÷ Mean × 100]	< 30%	< 15%	< 12%	< 10%	< 10%	< 8%	< 8%
SPR peak	512 – 522 nm	514 – 524 nm	521.5 ± 2.0 nm	521.5 ± 2.0 nm	525.5 ± 2.0 nm	535.5 ± 2.0 nm	552.0 ± 4.0 nm
Particle concentration (per mL) for OD = 1	0.3 – 1.1 × 10 <sup>14</sup>	2.5 – 8.6 × 10 <sup>12</sup>	5.0 – 8.6 × 10 <sup>11</sup>	1.3 – 2.0 × 10 <sup>11</sup>	5.2 – 7.2 × 10 <sup>10</sup>	1.5 – 2.0 × 10 <sup>10</sup>	6.3 – 7.9 × 10 <sup>9</sup>
Mass concentration (Au) (mg/ mL) for OD = 1	0.065 – 0.072	0.057 – 0.063	0.050 – 0.056	0.042 – 0.047	0.037 – 0.042	0.036 – 0.041	0.034 – 0.039
Particle Molar Concentration for OD = 1	0.5 – 1.9 × 10 <sup>-7</sup>	0.4 – 1.4 × 10 <sup>-8</sup>	0.8 – 1.5 × 10 <sup>-9</sup>	2.2 – 3.3 × 10 <sup>-10</sup>	8 – 12 × 10 <sup>-11</sup>	2.5 – 3.4 × 10 <sup>-11</sup>	1.0 – 1.3 × 10 <sup>-11</sup>
Zeta potential	> +2 mV						
pH	7 – 8.5						
Product Number	72456	55314	37775	84133	11876	75075	14389

PEG = Poly (ethylene glycol)

SPR = Surface Plasmon Resonance

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

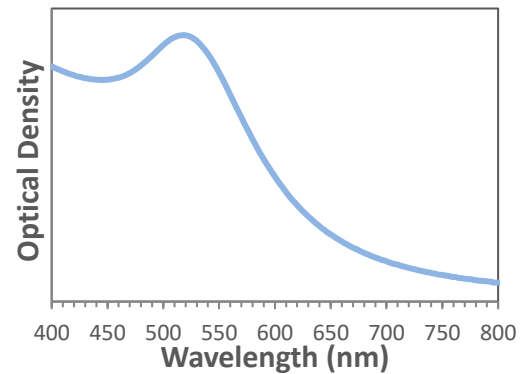
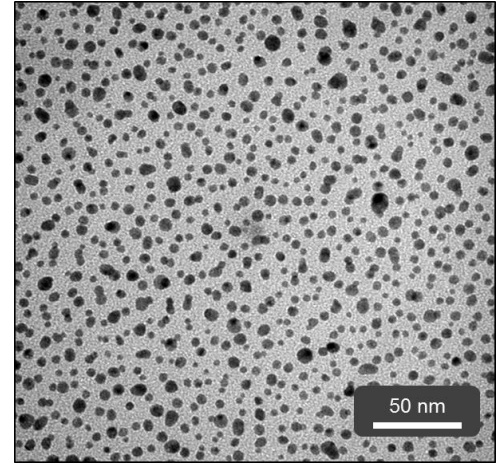
OD = Optical Density (using a 1 cm path length cuvette)

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# Gold NanoSpheres

## 5 nm Gold NanoSpheres, PEGylated, Amine Termination

	Product Specs	Lot-specific
Diameter	4-6 nm	4.8 nm
Diameter Deviation	< 1.5 nm	1.2 nm
SPR peak	512 – 522 nm	516 nm
Particle concentration (per mL) for OD = 1	$0.3 - 1.1 \times 10^{14}$	$0.59 \times 10^{14}$
Mass concentration (Au) (mg/ mL) for OD = 1	0.065 – 0.072	0.066
Particle Molar Concentration for OD = 1 (M)	$0.5 - 1.9 \times 10^{-7}$	$0.97 \times 10^{-7}$
Zeta potential	> +2 mV	+7.75 mV
pH	7 – 8.5	7.1
Particle surface	PEG-Amine (NH <sub>2</sub> )	
Solvent	DIUF Water	



PEG = Poly (ethylene glycol), 5kDa

SPR = Surface Plasmon Resonance

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

OD = Optical Density (using a 1 cm pathlength cuvette)

## Product Numbers

	Standard OD	Standard Volumes	Product #
Amine	OD = 1, 50, 100	1 – 1000 mL	72456

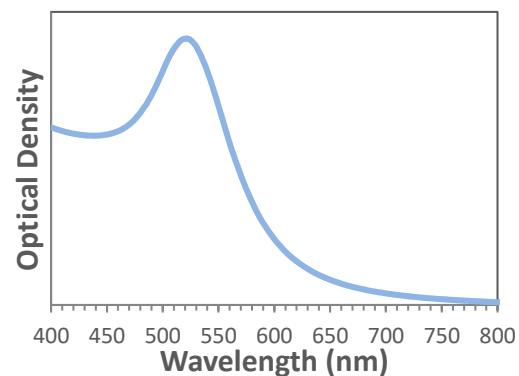
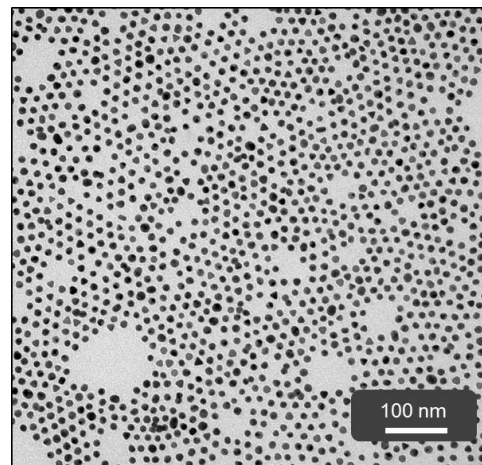
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## Gold NanoSpheres

### 10 nm Gold NanoSpheres, PEGylated, Amine Termination

	Product Specs	Lot-specific
Diameter	9-13 nm	11.2 nm
Diameter Deviation	< 1.5 nm	1.2 nm
SPR peak	514 – 524 nm	521 nm
Particle concentration (per mL) for OD = 1	$2.5 - 8.6 \times 10^{12}$	$4.0 \times 10^{12}$
Mass concentration (Au) (mg/ mL) for OD = 1	0.057 – 0.063	0.057
Particle Molar Concentration for OD = 1	$0.4 - 1.4 \times 10^{-8}$	$0.67 \times 10^{-8}$
Zeta potential	> +2 mV	+7.75 mV
pH	7 – 8.5	7.1
Particle surface	PEG-Amine (NH <sub>2</sub> )	
Solvent	DIUF Water	



PEG = Poly (ethylene glycol), 5kDa

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

	Standard OD	Standard Volumes	Product #
Amine	OD = 1, 50, 100	1 – 1000 mL	55314

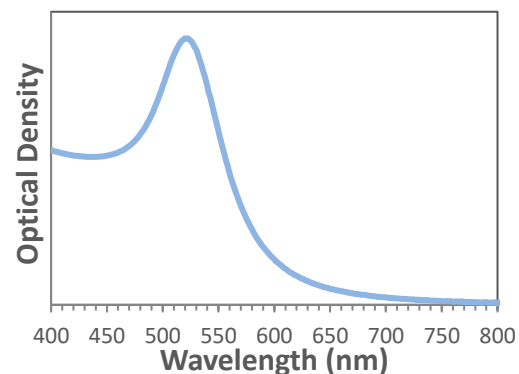
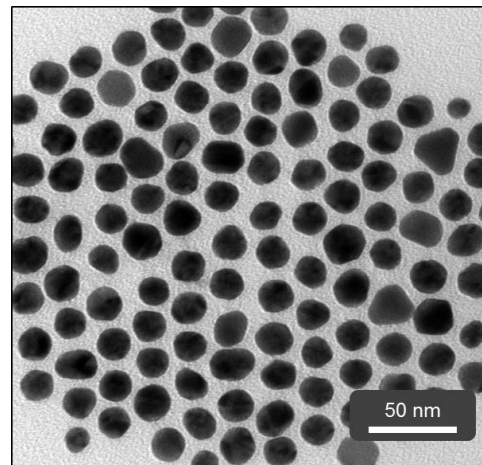
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## Gold NanoSpheres

### 20 nm Gold NanoSpheres, PEGylated, Amine Termination

	Product Specs	Lot-specific
Diameter	20 ± 1.5 nm	20.1 nm
Diameter Deviation	< 2.4 nm	1.7 nm
SPR peak	521.5 ± 2.0 nm	521.5 nm
Particle concentration (per mL) for OD = 1	5.0 – 8.6 × 10 <sup>11</sup>	6.1 × 10 <sup>11</sup>
Mass concentration (Au) (mg/ mL) for OD = 1	0.050 – 0.056	0.050
Particle Molar Concentration for OD = 1	0.8 – 1.5 × 10 <sup>-9</sup>	1.02 × 10 <sup>-9</sup>
Zeta potential	> +2 mV	+12.1 mV
pH	7 – 8.5	7.3
Particle surface	PEG-Amine (NH <sub>2</sub> )	
Solvent	DIUF Water	



PEG = Poly (ethylene glycol), 5kDa

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

	Standard OD	Standard Volumes	Product #
Amine	OD = 1, 50, 100	1 – 1000 mL	37775

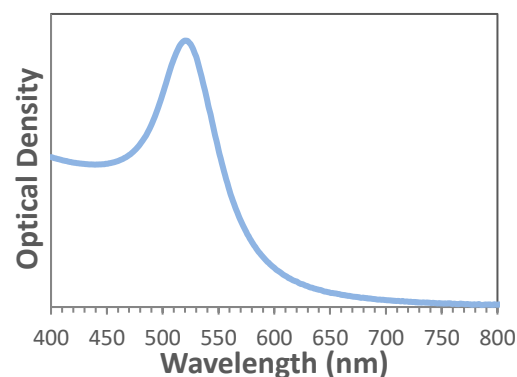
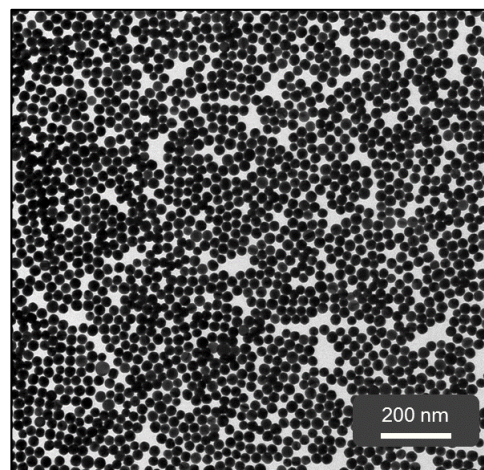
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## Gold NanoSpheres

### 30 nm Gold NanoSpheres, PEGylated, Amine Termination

	Product Specs	Lot-specific
Diameter	30 ± 1.5 nm	30.1 nm
Diameter Deviation	< 3.0 nm	2.3 nm
SPR peak	521.5 ± 2.0 nm	521.0 nm
Particle concentration (per mL) for OD = 1	1.3 – 2.0 × 10 <sup>11</sup>	1.6 × 10 <sup>11</sup>
Mass concentration (Au) (mg/ mL) for OD = 1	0.042 – 0.047	0.044
Particle Molar Concentration for OD = 1	2.2 – 3.3 × 10 <sup>-10</sup>	2.6 × 10 <sup>-10</sup>
Zeta potential	> +2 mV	+8.6 mV
pH	7 – 8.5	7.2
Particle surface	PEG-Amine (NH <sub>2</sub> )	
Solvent	DIUF Water	



PEG = Poly (ethylene glycol), 10kDa

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

	Standard OD	Standard Volumes	Product #
Amine	OD = 1, 50, 100	1 – 1000 mL	84133

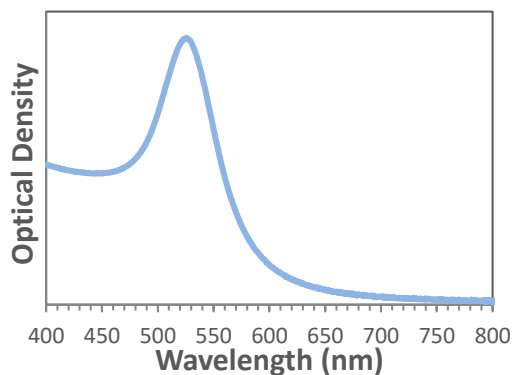
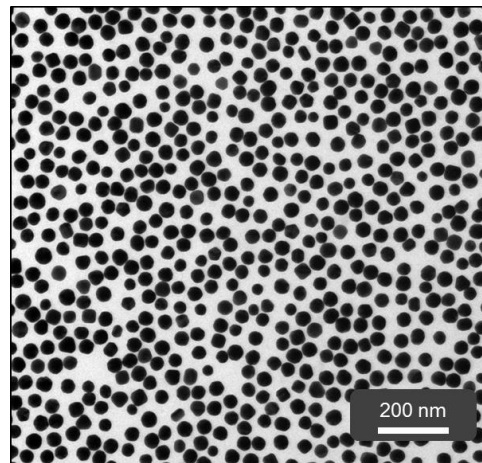
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## Gold NanoSpheres

### 40 nm Gold NanoSpheres, PEGylated, Amine Termination

	Product Specs	Lot-specific
Diameter	40 ± 1.5 nm	40.4 nm
Diameter Deviation	< 4.0 nm	3.0 nm
SPR peak	525.5 ± 2.0 nm	526.5 nm
Particle concentration (per mL) for OD = 1	5.2 – 7.2 × 10 <sup>10</sup>	5.9 × 10 <sup>10</sup>
Mass concentration (Au) (mg/ mL) for OD = 1	0.037 – 0.042	0.038
Particle Molar Concentration for OD = 1	8 – 12 × 10 <sup>-11</sup>	9.8 × 10 <sup>-11</sup>
Zeta potential	> +2 mV	+10.5 mV
pH	7 – 8.5	7.2
Particle surface	PEG-Amine (NH <sub>2</sub> )	
Solvent	DIUF Water	



PEG = Poly (ethylene glycol), 10kDa

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

	Standard OD	Standard Volumes	Product #
Amine	OD = 1, 50, 100	1 – 1000 mL	11876

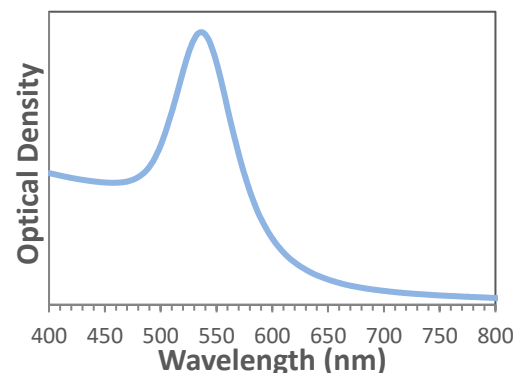
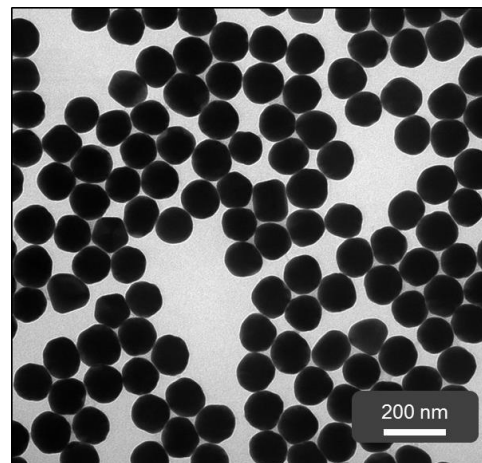
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## Gold NanoSpheres

### 60 nm Gold NanoSpheres, PEGylated, Amine Termination

	Product Specs	Lot-specific
Diameter	60 ± 1.5 nm	60.0 nm
Diameter Deviation	< 4.8 nm	2.8 nm
SPR peak	535.5 ± 2.0 nm	535.0 nm
Particle concentration (per mL) for OD = 1	1.5 – 2.0 × 10 <sup>10</sup>	1.7 × 10 <sup>10</sup>
Mass concentration (Au) (mg/ mL) for OD = 1	0.036 – 0.041	0.037
Particle Molar Concentration for OD = 1	2.5 – 3.4 × 10 <sup>-11</sup>	2.8 × 10 <sup>-8</sup>
Zeta potential	> +2 mV	+8.3 mV
pH	7 – 8.5	7.4
Particle surface	PEG-Amine (NH <sub>2</sub> )	
Solvent	DIUF Water	



PEG = Poly (ethylene glycol), 10kDa

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

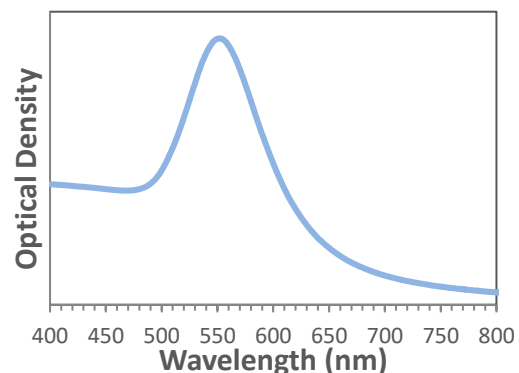
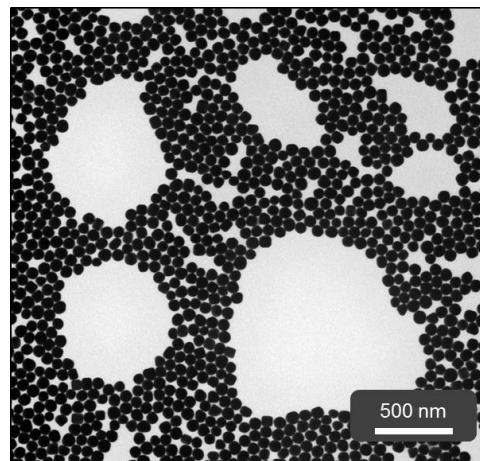
	Standard OD	Standard Volumes	Product #
Amine	OD = 1, 50, 100	1 – 1000 mL	75075



## Gold NanoSpheres

### 80 nm Gold NanoSpheres, PEGylated, Amine Termination

	Product Specs	Lot-specific
Diameter	80 ± 1.5 nm	79.6 nm
Diameter Deviation	< 6.4 nm	4.7 nm
SPR peak	552.0 ± 4.0 nm	549.0 nm
Particle concentration (per mL) for OD = 1	6.3 – 7.9 × 10 <sup>9</sup>	6.8 × 10 <sup>9</sup>
Mass concentration (Au) (mg/ mL) for OD = 1	0.034 – 0.039	0.035
Particle Molar Concentration for OD = 1	1.0 – 1.3 × 10 <sup>-11</sup>	1.1 × 10 <sup>-11</sup>
Zeta potential	> +2 mV	+6.3
pH	7 – 8.5	7.3
Particle surface	PEG-Amine (NH <sub>2</sub> )	
Solvent	DIUF Water	



PEG = Poly (ethylene glycol), 10kDa

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

	Standard OD	Standard Volumes	Product #
Amine	OD = 1, 50, 100	1 – 1000 mL	14389

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## Gold NanoSpheres

### Suggested Storage and Handling Procedures

**Store at 2 – 8 °C in polypropylene containers.** Storage at low temperature increases shelf life and stability of the nanoparticles, preventing changes in shape and/or size. Containers composed of other materials can change the colloidal stability of the nanoparticles.

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

**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 1 minute, shake, and repeat as necessary. To minimize heating, do not sonicate for periods longer than 1 minute.

**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 0.45 µm polyvinylidene fluoride filter and save the filtered product. Check quality with spectrophotometry and electron microscopy.