



# Silica-coated Gold NanoRods

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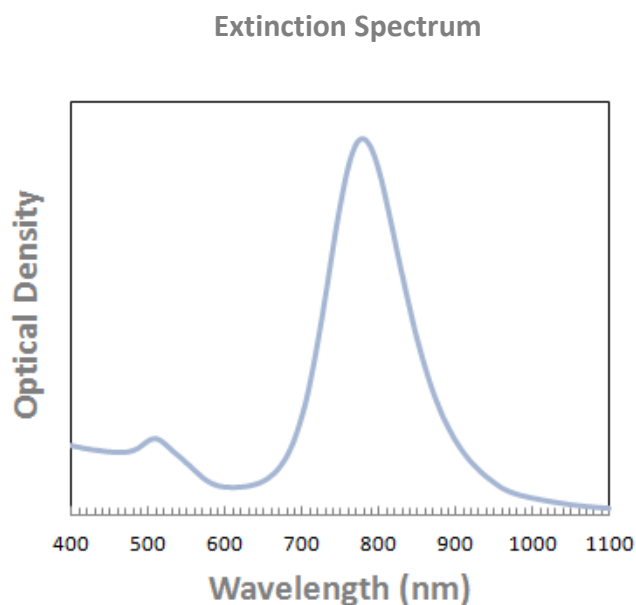
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## Silica-coated Gold NanoRods

### Gold NanoRods, Silica coating, LSPR 780 nm

|   | Product Specs                | Lot-specific           |
|---|------------------------------|------------------------|
| LSPR peak                                   | 770 - 790 nm                 | 775 nm                 |
| NanoRod Diameter                            | 9.5 – 11.5 nm                | 11.3 ± 1.3 nm          |
| NanoRod Length                              | 35 – 45 nm                   | 42.6 ± 4.2 nm          |
| Aspect Ratio                                | 3.7 – 3.9                    | 3.8                    |
| LSPR/TSPR Ratio                             | > 3.5                        | 4.0                    |
| LSPR Width at 80% Max                       | < 75 nm                      | 69 nm                  |
| Particle concentration (per mL) for OD = 1  | 7.8 – 8.2 × 10 <sup>11</sup> | 8.0 × 10 <sup>11</sup> |
| Mass concentration - Au (mg/mL) for OD = 1  | 0.04 – 0.05                  | 0.045                  |
| Particle Molar Concentration (M) for OD = 1 | 1.2 – 1.4 × 10 <sup>-9</sup> | 1.3 × 10 <sup>-9</sup> |
| Silica Thickness                            | 18 – 22 nm                   | 20.4 ± 1.4 nm          |
| Zeta potential                              | < -15 mV                     | -41.2                  |
| pH  | 8.0 – 9.0                    | 8.2                    |
| Particle Surface                            | Silica                       |                        |
| Solvent                                     | DIUF Water                   |                        |



LSPR = Longitudinal Surface Plasmon Resonance, TSPR= Transverse Surface Plasmon Resonance

Hydroxyl= Bare silica surface, hydroxyl termination

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

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

## Product Numbers

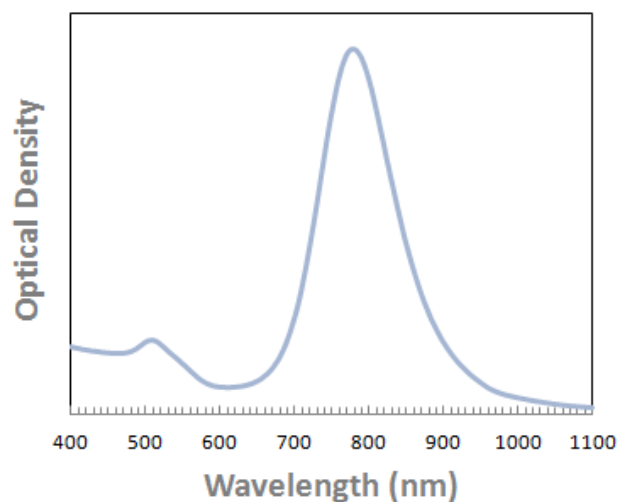
| Coating | Termination       | OD       | Volume | LSPR 780 nm  |
|---------|-------------------|----------|--------|--------------|
| Silica  | Silica (Hydroxyl) | OD = 1   | 10 mL  | 46400-L010ML |
|         |                   |          | 2.5 mL | 46400-L2.5ML |
|         |                   | OD = 100 | 1 mL   | 46400-H001ML |
|         |                   |          | 250 µL | 46400-H250UL |

## Silica-coated Gold NanoRods

### Gold NanoRods, Silica + PEG coating, LSPR 780 nm

|   | Product Specs                | Lot-specific           |
|---|------------------------------|------------------------|
| LSPR peak                                   | 770 - 790 nm                 | 778 nm                 |
| NanoRod Diameter                            | 9.5 – 11.5 nm                | 11.1 ± 0.9 nm          |
| NanoRod Length                              | 35 – 45 nm                   | 43.1 ± 3.9 nm          |
| Aspect Ratio                                | 3.7 – 3.9                    | 3.8                    |
| LSPR/TSPR Ratio                             | > 3.5                        | 4.1                    |
| LSPR Width at 80% Max                       | < 75 nm                      | 64 nm                  |
| Particle concentration (per mL) for OD = 1  | 7.8 – 8.2 × 10 <sup>11</sup> | 8.0 × 10 <sup>11</sup> |
| Mass concentration - Au (mg/mL) for OD = 1  | 0.04 – 0.05                  | 0.045                  |
| Particle Molar Concentration (M) for OD = 1 | 1.2 – 1.4 × 10 <sup>-9</sup> | 1.3 × 10 <sup>-9</sup> |
| Silica Thickness                            | 18 – 22 nm                   | 19.6 ± 1.1 nm          |
| Zeta potential                              | - 5 ± 5 mV                   | 2.7 mV                 |
| pH  | 6 – 8                        | 7.4                    |
| Particle surface                            | PEG                          |                        |
| Solvent                                     | DIUF Water                   |                        |

Extinction Spectrum



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

LSPR = Longitudinal Surface Plasmon Resonance, TSPR= Transverse Surface Plasmon Resonance

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

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

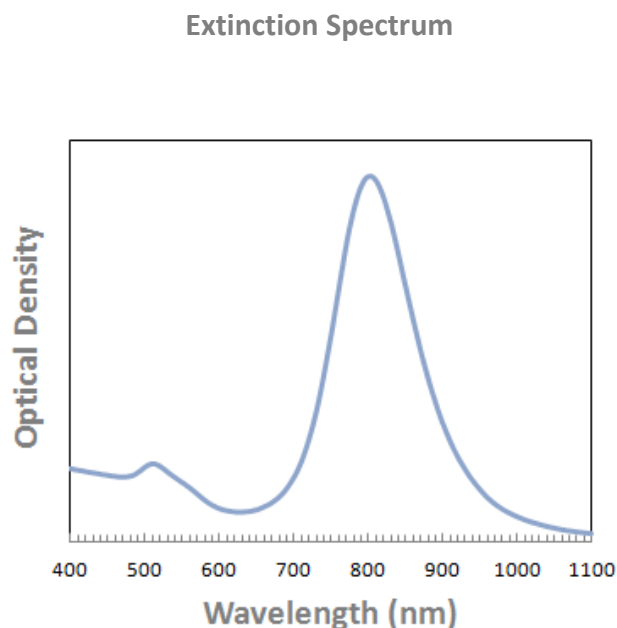
## Product Numbers

| Coating      | Termination | OD       | Volume | LSPR 780 nm  |
|--------------|-------------|----------|--------|--------------|
| Silica + PEG | PEG         | OD = 1   | 10 mL  | 27333-L010ML |
|              |             |          | 2.5 mL | 27333-L2.5ML |
|              |             | OD = 100 | 1 mL   | 27333-H001ML |
|              |             |          | 250 µL | 27333-H250UL |

## Silica-coated Gold NanoRods

### Gold NanoRods, Silica coating, LSPR 808 nm

|   | Product Specs                | Lot-specific           |
|---|------------------------------|------------------------|
| LSPR peak                                   | 798 - 818 nm                 | 810 nm                 |
| NanoRod Diameter                            | 9.5 – 11.5 nm                | 11.0 ± 1.4 nm          |
| NanoRod Length                              | 38 – 48 nm                   | 44.8 ± 4.7 nm          |
| Aspect Ratio                                | 4.0 – 4.3                    | 4.1                    |
| LSPR/TSPR Ratio                             | > 3.5                        | 4.4                    |
| LSPR Width at 80% Max                       | < 80 nm                      | 75 nm                  |
| Particle concentration (per mL) for OD = 1  | 7.0 – 7.5 × 10 <sup>11</sup> | 7.3 × 10 <sup>11</sup> |
| Mass concentration - Au (mg/mL) for OD = 1  | 0.04 – 0.05                  | 0.045                  |
| Particle Molar Concentration (M) for OD = 1 | 1.1 – 1.3 × 10 <sup>-9</sup> | 1.2 × 10 <sup>-9</sup> |
| Silica Thickness                            | 18 – 22 nm                   | 20.3 ± 1.8 nm          |
| Zeta potential                              | < -15 mV                     | -37.8 mV               |
| pH  | 8.0 – 9.0                    | 8.3                    |
| Particle Surface                            | Silica                       |                        |
| Solvent                                     | DIUF Water                   |                        |



LSPR = Longitudinal Surface Plasmon Resonance, TSPR= Transverse Surface Plasmon Resonance

Hydroxyl= Bare silica surface, hydroxyl termination

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 | LSPR 808 nm  |
|---------|-------------------|----------|--------|--------------|
| Silica  | Silica (Hydroxyl) | OD = 1   | 10 mL  | 14649-L010ML |
|         |                   |          | 2.5 mL | 14649-L2.5ML |
|         |                   | OD = 100 | 1 mL   | 14649-H001ML |
|         |                   |          | 250 µL | 14649-H250UL |

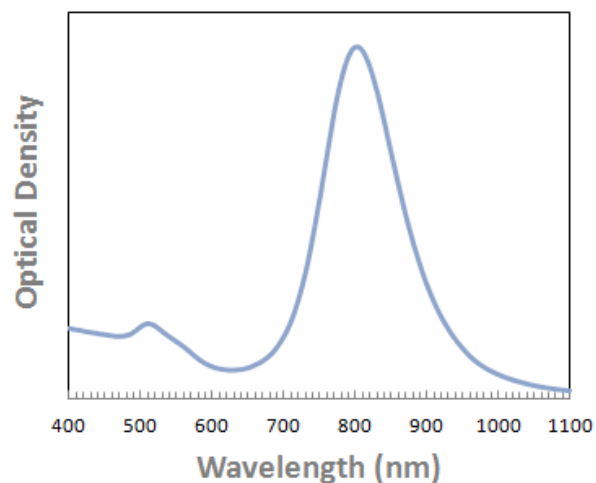
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## Silica-coated Gold NanoRods

### Gold NanoRods, Silica + PEG coating, LSPR 808 nm

|   | Product Specs                | Lot-specific           |
|---|------------------------------|------------------------|
| LSPR peak                                   | 798 - 818 nm                 | 810 nm                 |
| NanoRod Diameter                            | 9.5 – 11.5 nm                | 9.7 ± 1.2 nm           |
| NanoRod Length                              | 38 – 48 nm                   | 42.2 ± 3.1 nm          |
| Aspect Ratio                                | 4.0 – 4.3                    | 4.3                    |
| LSPR/TSPR Ratio                             | > 3.5                        | 4.0                    |
| LSPR Width at 80% Max                       | < 80 nm                      | 68 nm                  |
| Particle concentration (per mL) for OD = 1  | 7.0 – 7.5 × 10 <sup>11</sup> | 7.3 × 10 <sup>11</sup> |
| Mass concentration - Au (mg/mL) for OD = 1  | 0.04 – 0.05                  | 0.045                  |
| Particle Molar Concentration (M) for OD = 1 | 1.1 – 1.3 × 10 <sup>-9</sup> | 1.2 × 10 <sup>-9</sup> |
| Silica Thickness                            | 18 – 22 nm                   | 19.3 ± 1.2 nm          |
| Zeta potential                              | - 5 ± 5 mV                   | 4.8 mV                 |
| pH  | 6 – 8                        | 7.2                    |
| Particle surface                            | PEG                          |                        |
| Solvent                                     | DIUF Water                   |                        |

Extinction Spectrum



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

LSPR = Longitudinal Surface Plasmon Resonance, TSPR= Transverse 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 | LSPR 808 nm  |
|--------------|-------------|----------|--------|--------------|
| Silica + PEG | PEG         | OD = 1   | 10 mL  | 79327-L010ML |
|              |             |          | 2.5 mL | 79327-L2.5ML |
|              |             | OD = 100 | 1 mL   | 79327-H001ML |
|              |             |          | 250 µL | 79327-H250UL |

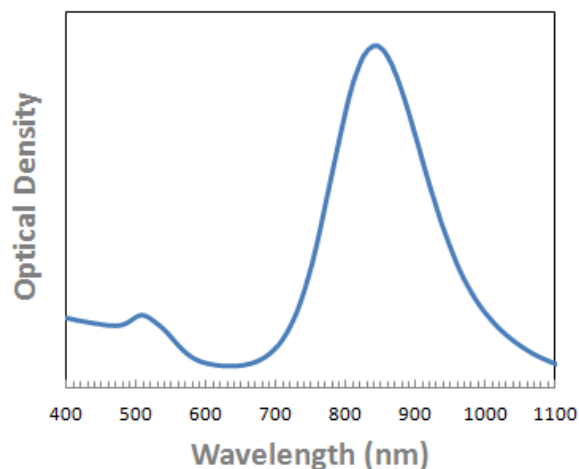
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## Silica-coated Gold NanoRods

### Gold NanoRods, Silica coating, LSPR 850 nm

|   | Product Specs                | Lot-specific            |
|---|------------------------------|-------------------------|
| LSPR peak                                   | 840 - 860 nm                 | 857 nm                  |
| NanoRod Diameter                            | 9.5 – 11.5 nm                | 10.9 ± 1.0 nm           |
| NanoRod Length                              | 42 – 52 nm                   | 48.8 ± 4.7 nm           |
| Aspect Ratio                                | 4.4 – 4.7                    | 4.5                     |
| LSPR/TSPR Ratio                             | > 3.5                        | 4.0                     |
| LSPR Width at 80% Max                       | < 95 nm                      | 81 nm                   |
| Particle concentration (per mL) for OD = 1  | 6.2 – 6.7 × 10 <sup>11</sup> | 6.5 × 10 <sup>11</sup>  |
| Mass concentration - Au (mg/mL) for OD = 1  | 0.04 – 0.05                  | 0.045                   |
| Particle Molar Concentration (M) for OD = 1 | 0.9 – 1.2 × 10 <sup>-9</sup> | 1.06 × 10 <sup>-9</sup> |
| Silica Thickness                            | 18 – 22 nm                   | 18.2 ± 1.1 nm           |
| Zeta potential                              | < -15 mV                     | -25.9 mV                |
| pH  | 8.0 – 9.0                    | 8.2                     |
| Particle Surface                            | Silica                       |                         |
| Solvent                                     | DIUF Water                   |                         |

Extinction Spectrum



LSPR = Longitudinal Surface Plasmon Resonance, TSPR= Transverse Surface Plasmon Resonance

Hydroxyl= Bare silica surface, hydroxyl termination

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 | LSPR 850 nm  |
|---------|-------------------|----------|--------|--------------|
| Silica  | Silica (Hydroxyl) | OD = 1   | 10 mL  | 83741-L010ML |
|         |                   |          | 2.5 mL | 83741-L2.5ML |
|         |                   | OD = 100 | 1 mL   | 83741-H001ML |
|         |                   |          | 250 µL | 83741-H250UL |

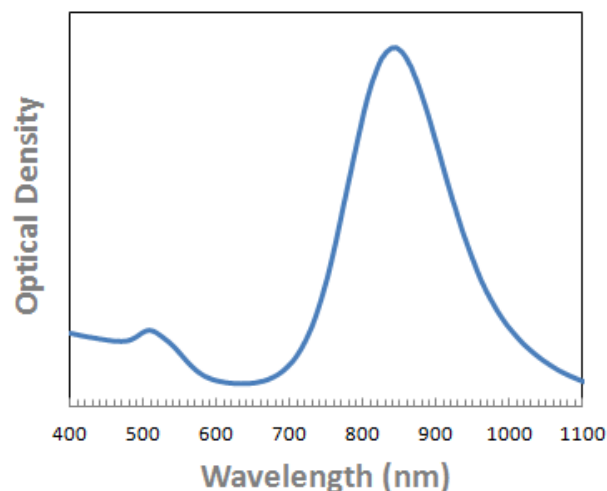
NanoHybrids warrants that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. Purchaser must determine the suitability of the product for their particular use.

## Silica-coated Gold NanoRods

### Gold NanoRods, Silica + PEG coating, LSPR 850 nm

|   | Product Specs                | Lot-specific           |
|---|------------------------------|------------------------|
| LSPR peak                                   | 840 - 860 nm                 | 857 nm                 |
| NanoRod Diameter                            | 9.5 – 11.5 nm                | 10.9 ± 1.3 nm          |
| NanoRod Length                              | 42 – 52 nm                   | 48 ± 6.1 nm            |
| Aspect Ratio                                | 4.4 – 4.7                    | 4.4                    |
| LSPR/TSPR Ratio                             | > 3.5                        | 4.0                    |
| LSPR Width at 80% Max                       | < 95 nm                      | 82 nm                  |
| Particle concentration (per mL) for OD = 1  | 6.2 – 6.7 x 10 <sup>11</sup> | 6.4 x 10 <sup>11</sup> |
| Mass concentration - Au (mg/mL) for OD = 1  | 0.04 – 0.05                  | 0.043                  |
| Particle Molar Concentration (M) for OD = 1 | 0.9 – 1.2 x 10 <sup>-9</sup> | 1.1 x 10 <sup>-9</sup> |
| Silica Thickness                            | 18 – 22 nm                   | 21.5 ± 1.2 nm          |
| Zeta potential                              | - 5 ± 5 mV                   | 1.8 mV                 |
| pH  | 6 – 8                        | 7.3                    |
| Particle surface                            | PEG                          |                        |
| Solvent                                     | DIUF Water                   |                        |

Extinction Spectrum



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

LSPR = Longitudinal Surface Plasmon Resonance, TSPR= Transverse 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 | LSPR 850 nm  |
|--------------|-------------|----------|--------|--------------|
| Silica + PEG | PEG         | OD = 1   | 10 mL  | 43325-L010ML |
|              |             |          | 2.5 mL | 43325-L2.5ML |
|              |             | OD = 100 | 1 mL   | 43325-H001ML |
|              |             |          | 250 µL | 43325-H250UL |

## Silica-coated Gold NanoRods

### 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.