

## Storage and Handling Procedures

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## Gold, Platinum and Silver Nanoparticle Storage and Handling Procedures

**Store Gold and Platinum at 2-25°C. Store Silver at 2-8°C, away from light.  
DO NOT FREEZE.**

### Storage:

**STORE SILVER PRODUCTS AWAY FROM LIGHT AT 2-8 °C.** Short periods at room temperature and in ambient light are acceptable; however, storage at lower temperatures prolongs the shelf life and prolonged exposure to light can change the material size or shape.

**Gold and Platinum products may be stored either refrigerated or at room temperature 2-25 °C.**

**DO NOT FREEZE.** If frozen, the nanoparticles will irreversibly aggregate and the solution color will change. When stored at 2-8 °C and away from light, the silver nanoparticles are stable for at least 1 year.

### Handling:

**SHAKE EACH BOTTLE PRIOR TO USE.** During storage the nanoparticles may settle to the bottom of the vial. Prior to aliquoting or otherwise using the nanoparticles, resuspend the settled nanoparticles by vigorously shaking the bottle until a homogenous solution is obtained (typically ~ 30 seconds). Visually inspect the bottom of the container to ensure that no settled particles remain.

**SONICATE BOTTLES THAT EXHIBIT PLATING PRIOR TO USE.** During storage a small amount of metal plating may develop on the sides or bottom of bottles. If plating is observed, place the bottle in a bath sonicator for no more than 30 seconds. Remove and shake the bottle. If plating is still visible, wait 30 seconds before sonicating again for <30 seconds (to limit excessive heating of the particles). Repeat as necessary until plating is no longer visible.

### Quality Control:

After resuspending the particles, be sure to visually check for signs of aggregation before use. Look for any dark-colored particulates floating in the solution, a decrease in the solution's color intensity, or a shift in the solution's color. If any of these are observed, the materials should be analyzed via UV-Visible spectroscopy, DLS, or TEM for quality verification.

### Questions?

Please visit our [Knowledge Base \(ncx.bz/kb\)](http://ncx.bz/kb) for more information, including [Frequently Asked Questions \(ncx.bz/faq\)](http://ncx.bz/faq) and detailed storage, handling, and quality control procedures. You may also contact us by email at [support@nanocomposix.com](mailto:support@nanocomposix.com), or by phone at (858) 565-4227.

## Dried Nanopowder Storage and Handling Procedures

### Nanopowder Storage and Redispersion:

**STORE DRIED SILVER AWAY FROM LIGHT AT 2-25 °C IN A DRY PLACE. STORE DRIED GOLD AT 2-25 °C IN A DRY PLACE.**

Storage of dried nanopowders at room temperature is acceptable; however, lower temperature storage prolongs the shelf life of the product. For silver, short periods in ambient light conditions are acceptable; however prolonged exposure to light may change the material size or shape. Dried gold can be handled in normal ambient light conditions without risk. The nanopowders are sealed under vacuum to limit exposure to air and moisture, but storage away from excess moisture and humidity is recommended.

**ADD SOLVENT AND BATH SONICATE TO REDISPERSE.** The dried powder may be redispersed by adding water or other appropriate solvent directly to the storage vial, or small amounts of the powder may be transferred to other containers and redispersed as needed. Use caution when handling nanopowders as they pose inhalation hazards and can be difficult to quantitatively transfer due to static effects. We recommend adding at least 1 mL of solvent per each 1 mg of nanoparticles (not including excess PVP) to be redispersed, and bath sonicating for 30-60 seconds or until the powder has completely redissolved. (**NOTE:** To extend the shelf life of PVP dispersions, a reconstitution of the nanopowder using 2mM sodium citrate buffer is recommended)

### Dispersion Storage:

**STORE SILVER PRODUCTS AWAY FROM LIGHT AT 2-8 °C.** Short periods at room temperature are acceptable; however, lower temperature storage prolongs the shelf life of the product. Short periods in ambient light conditions are acceptable; however prolonged exposure to light may change the material size or shape.

**DO NOT FREEZE.** If the dispersion is frozen, the nanoparticles will irreversibly aggregate and the solution color will change. When stored at 2-8 °C and away from light, the silver nanoparticles are stable for at least 1 year.

**SHAKE EACH BOTTLE PRIOR TO USE.** During storage the nanoparticles may settle to the bottom of the vial. Prior to aliquoting or otherwise using the nanoparticles, resuspend the settled nanoparticles by vigorously shaking the bottle until a homogenous solution is obtained. Typically this will require approximately 30 seconds of mixing. Visually inspect the bottom of the container to ensure that there are no remaining settled particles.

**SONICATE BOTTLES THAT EXHIBIT PLATING PRIOR TO USE.** During storage a small amount of metal plating may develop on the sides or bottom of bottles. If plating is observed, place the bottle in a bath sonicator for no more than 30 seconds. Remove and shake the bottle. If plating is still visible, wait 30 seconds before sonicating again for <30 seconds (to limit excessive heating of the particles). Repeat as necessary until plating is no longer visible.

### Quality Control:

After redispersion if there are any dark colored particulates visible floating in the solution, if the intensity of the color of the solution has decreased, or if there is a shift in the color of the solution then the nanoparticles may have aggregated. These materials should be analyzed via UV-Visible spectroscopy, DLS, or TEM for quality verification.

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## Organic-Solvent Compatible Nanoparticle Storage and Handling Procedures

### Dried Film Storage and Redispersion:

**STORE AWAY FROM LIGHT AT 2-25 °C IN A DRY PLACE.** Storage of dried nanopowders at room temperature is acceptable; however, lower temperature storage prolongs the shelf life of the product. Short periods in ambient light conditions are acceptable; however prolonged exposure to light may change the material size or shape. The nanopowders are sealed under vacuum to limit exposure to air and moisture, but storage away from excess moisture and humidity is recommended.

**ADD SOLVENT AND BATH SONICATE TO REDISPERSE.** The dried nanoparticle films may be redispersed by adding an appropriate solvent directly to the storage vial and vortexing or bath sonicating for 30-60 seconds, or until the film has completely redissolved.

### Dispersion Storage:

**STORE PRODUCTS AWAY FROM LIGHT AT 2-8 °C.** Short periods at room temperature are acceptable; however, lower temperature storage prolongs the shelf life of the product. Short periods in ambient light conditions are acceptable; however prolonged exposure to light may change the material size or shape.

**DO NOT FREEZE.** If the dispersion is frozen, the nanoparticles will irreversibly aggregate and the solution color will change.

**SHAKE EACH BOTTLE PRIOR TO USE.** During storage the nanoparticles may settle to the bottom of the vial. Prior to aliquoting or otherwise using the nanoparticles, resuspend the settled nanoparticles by vigorously shaking the bottle until a homogenous solution is obtained. Typically this will require approximately 30 seconds of mixing. Visually inspect the bottom of the container to ensure that there are no remaining settled particles.

**SONICATE BOTTLES THAT EXHIBIT PLATING PRIOR TO USE.** During storage a small amount of metal plating may develop on the sides or bottom of bottles. If plating is observed, place the bottle in a bath sonicator for no more than 30 seconds. Remove and shake the bottle. If plating is still visible, wait 30 seconds before sonicating again for <30 seconds (to limit excessive heating of the particles). Repeat as necessary until plating is no longer visible.

### Quality Control:

After redispersion if there are any dark colored particulates visible floating in the solution, if the intensity of the color of the solution has decreased, or if there is a shift in the color of the solution then the nanoparticles may have aggregated. These materials should be analyzed via UV-Visible spectroscopy, DLS, or TEM for quality verification.

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## Silica Nanoparticle Storage and Handling Procedures

### Storage:

**STORE PRODUCTS AT ROOM TEMPERATURE.** Storage of silica nanoparticle dispersions and powders at room temperature is recommended. They may also be refrigerated, if desired. When stored at room temperature, the nanoparticles are stable for at least 1 year.

### Handling:

**SHAKE AND BATH SONICATE EACH BOTTLE PRIOR TO USE.** During storage, the nanoparticles may settle to the bottom of the vial. Larger nanoparticles will settle much faster than smaller ones. Prior to aliquoting or otherwise using the nanoparticles, resuspend the settled nanoparticles by vigorously shaking the bottle until a homogenous solution is obtained. Typically this will require approximately 30 seconds of mixing. Additionally, a bath sonication of between 10-15 minutes is often the most effective method of re-suspending the settled silica nanoparticles. Visually inspect the bottom of the container to ensure that there are no remaining settled particles.

### Redispersing Dry Silica:

**ADD SOLVENT AND BATH SONICATE TO REDISPERSE.** The dried powder can be redispersed by adding water or other appropriate solvent directly to the storage vial, or small amounts of the powder may be transferred to other containers and redispersed as needed. Use caution when handling nanopowders as they pose inhalation hazards and can be difficult to quantitatively transfer due to static effects. We recommend adding 1 mL of solvent per each 10 mg of nanoparticles to be redispersed, and bath sonicating for 20-30 minutes or until the powder has completely redissolved. If a higher concentration is desired, it may take a longer bath sonication period to ensure successful resuspension. Acceptable solvents for non-functionalized silica redispersion include water and certain alcohols such as ethanol. For best results in redispersing aminated silica, a low pH buffer (4-5) such as acetate or an alcohol such as ethanol is acceptable. Due to the solubility of silica in aqueous solutions, it is not encouraged to redisperse or dilute the silica nanoparticles to less than 10 mg/mL.

### Quality Control:

After redispersion, if the particles are less than  $\sim 1\mu\text{m}$  in diameter, they should not settle rapidly. If significant settling is seen within the first  $\sim 15$ -20 minutes after redispersion, then the nanoparticles may have aggregated. These materials should be analyzed via DLS or TEM for quality verification.

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## Magnetite Nanoparticle Storage and Handling Procedures

**Store at 2-25°C, DO NOT FREEZE.**

### Storage:

**STORE PRODUCTS AT 2-25 °C.** Storage of Magnetite nanoparticles at 2-25°C is acceptable.

**DO NOT FREEZE.** If frozen, the nanoparticles will irreversibly aggregate and the particles in solution will not behave the same way. When stored at 2-25 °C nanoparticles are stable for at least 1 year.

### Handling:

**SHAKE AND BATH SONICATE EACH BOTTLE PRIOR TO USE.** During storage, the nanoparticles may settle to the bottom of the vial due to their magnetic nature to attract one another, however, this is typically reversible. Prior to aliquoting or otherwise using the nanoparticles, resuspend the settled nanoparticles by vigorously shaking the bottle until a homogenous solution is obtained. Typically this will require approximately 30 seconds of mixing. Additionally, a bath sonication of between 30 seconds to 2 minutes is also the most effective method of re-suspending the settled magnetite nanoparticles. Visually inspect the bottom of the container to ensure that there are no remaining settled particles.

### Redispersing Dry Magnetite:

**ADD SOLVENT AND BATH SONICATE TO REDISPERSE.** The dried powder can be redispersed by adding water or other appropriate solvent directly to the storage vial, or small amounts of the powder may be transferred to other containers and redispersed as needed. Use caution when handling nanopowders as they pose inhalation hazards and can be difficult to quantitatively transfer due to static effects. We recommend adding 1 mL of solvent per each 20 mg of nanoparticles to be redispersed, and bath sonicating for 20-30 minutes or until the powder has completely redissolved. If a higher concentration is desired, it may take a longer bath sonication period to ensure successful resuspension. Since the magnetite is dried down from a solution of 2mM citrate at pH ~7.4 redispersing in water is optimal as they can tend to flocculate at lower pH conditions.

### Quality Control:

After redispersion if the particles are less than ~50 nm in diameter, they should not settle within a few minutes. If settling is seen within the first ~5 minutes after redispersion, then the nanoparticles may have aggregated. These materials should be analyzed via DLS, or TEM for quality verification.

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