Applications of Gold Nanoparticle Coatings

Gold nanoparticles are frequently used because of their outstanding properties and their varied functionalities. Owing to their properties, they have been used in many high-end applications as coatings, which are crucial for the development of nanotechnology. This blog post will look at the specific applications of gold nanoparticle coatings and the benefits they provide.

The Applications of Gold Nanoparticle Coatings

Gold nanoparticle coating is frequently used to add a protective layer to a specific material. By covering a substrate surface with gold nanoparticles, via the deposition method, scientists are adding a robust and corrosion-resistant layer that can be used in a range of applications for three main reasons. These reasons include improving a substrate's properties, look or resistance levels. Some typical applications that benefit from gold nanoparticle coatings include the following:

Catalysis

Unitized regenerative fuel cells (URFC) convert electricity throughout their operations; corrosion can occur on specific components such as bipolar plates. Using gold nanoparticle coatings on the bipolar plates helps to prevent oxidation and reduce the level of corrosion.

Graphene

Graphene is frequently used because of the many benefits it provides. However, it is still sensitive and susceptible to corrosion and surface oxidation. Adding graphene layers onto a gold surface improves the material's resistance to corrosion and sensitivity.

Life Science

With regard to intracellular bacteria, using gold to coat silver nanoparticles helps to improve antibacterial activity. Gold-coated silver nanoparticles have an improved level of dispersion stability and enhanced antimicrobial activity when facing intracellular bacteria[1].

SERS

To enhance the sensitivity of Raman spectroscopy for detection at the sub parts per million (ppm) range, substrates are often coated with gold. Surface enhanced Raman is a powerful technique bolstered by the plasmonic properties of nanostructured gold, enabling the enhancement of Raman signals for a raft of applications.

Sensors

Gold coating via pulsed laser deposition (PLD) has proved to have significant advantages to DNA biosensors. Silicon microcantilever sensors are coated in gold to enhance the performance of biomechanical sensors, meaning a measurable surface stress change can be observed, and signals can be quantified based on the rate of the applied change, limits of the change and the temporal evolution of the stress response[2].

The Advantages of Gold Nanoparticle Coatings

Several advantages of using gold nanoparticle coatings provide in a wide variety of applications. Not only are they small in size, but they can interact with a range of substances. Below, we have listed additional benefits of gold nanoparticle coatings.

- Corrosion Resistance
- Low in Toxicity
- Optical Effects
- Protective Layers
- Versatile
- Weather Resistant

If you would like more information about the applications of gold nanoparticle coatings or further details on our products, please don't hesitate to contact us.

References

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