

# Particle Size, And Ionic vs. Metallic Silver Products

From Powers International Inc.

## Introduction

Much ado has been made about particle size in the effectiveness of silver products. There is a great deal of misinformation circulating the web about Nano silver products, including those products manufactured by Powers International Inc. Because Powers International's manufacturing partners have invested millions of dollars in testing and research, and have independent data from numerous universities and private institutions, they have information that no other company has access to. This study and test information can defray some of the misinformation that resounds on this subject.

## Is Smaller Always Better In Silver Particles?

The statement "Smaller is always better" when it comes to silver nano-particles, is generally true, but only to a certain point. The actual answer was released in the data within the company's new patent. (The link to the new patent can be obtained by contacting Powers International Inc.). On page 11 of the new patent, under the heading of "2. Size Analysis" it states, "*The smaller the average particle size, the greater the surface area and the greater the contribution of the particular surface chemistry. However, if the particles are excessively small there can be a loss of stability and/or other interactions that negatively affect the product.*" This indicates that there is an optimal particle size for effectiveness of silver Nano-particles. If the particle size becomes too small, the product loses effectiveness. The knowledge of optimal particle sizes has helped our manufacturing partners file and receive patents on what the company deems the most bio-active or most effective particle size. Powers International Inc. via their manufacturer now owns the rights to these particular particle sizes, and no other company or person can legally make a similar product within approximately the next two decades.

## Which is More Effective and Safe, Metallic Silver or Ionic Silver?

Many claims are made about the effectiveness of metallic vs ionic silver products, each side claiming their type of silver product to be the most effective. In a study at Brigham Young University, a professor found that most of the silver products purchased and tested from the public market, claimed to be metallic silver products, but were actually just ionic or chemical forms of silver. Most ionic forms of silver are very easy to make. Usually, a chemical form of silver (ie. Silver Nitrate) is taken and diluted down to a certain ppm level, and then a protein is added to the silver because most ionic forms of silver are not stable. The added protein helps to keep the silver from falling out of suspension. Ionic or chemical forms of silver tend to kill bacteria one or two minutes faster than metallic particles in test tube studies, but are much less effective in human studies. They are less effective because once inside the body, ionic silver takes electrons from other cells and are thus quickly neutralized in their first pass through the liver. In other words, the effectiveness of ionic silver is very short term. True metallic Nano-particles are not neutralized in the first pass through the liver, but continue to function until they are ultimately washed through the system, which is estimated to take two days.

New independent peer-review reports from leading universities have started to shed light on the differences of metallic vs ionic forms of silver.

A new peer-review report from Pennsylvania State University was just released after years of studying a number of colloidal silver and silver aquasol products purchased from the U.S. market. The paper was authored by Professor Rustum Roy, along with seven other professors and scientists. The report is titled, "*Ultradilute Ag-Aquasols with extraordinary bactericidal properties: the role of the system Ag-O-H<sub>2</sub>O.*" On the subject of ionic vs metallic silver for human use, the report states (page 2, fourth paragraph): "*In spite of this enormous range of data, it is extraordinary that no major effort has been made to confirm and expand on the role of metallic silver in human health—especially in light of its huge advantage in lack of side effects. (Ingestion of excessive amounts of ionic (soluble) silver, not metallic solid particles is reported to have resulted in a very rare condition labeled argyria, an (irreversible?) darkening of the skin. No one has died of this condition. The safety of metallic silver sols is firmly established by the data cited above.)*"

## Are The Products Made By Powers International Inc. Ionic Or Metallic?

Because of misrepresentations made by technology-inhibited competitors of Powers International Inc., the question is best answered by independent and technologically superior labs and institutions. Included in the peer-review

paper cited above, from Pennsylvania State University, was test work jointly accomplished at six different state-of-the-art labs, including labs at Penn State University (the number-one-ranked material science lab in the world), Arizona State University, University of Puerto Rico, and three other scientific institutions. Jointly they studied three products made by Powers International Inc. (10 ppm, 22ppm, 32ppm), and made nine conclusions to end the peer-review paper (two of nine conclusions made are cited here to answer these direct questions and are quoted verbatim from the paper).

\* *“The very potent biologically active silver aquasols contained, typically, the amounts of silver claimed by the manufacturer, typically from 10-30 ppm by weight of Ag. **The silver was very pure as was the water.**”*

\* *“The dominant, by far, crystalline solid phase detected in the vast majority of SEM TEM studies is **metallic silver.**”*

In other words, the studies found that the products made by Powers International Inc. were very pure and clean, contained the correct amounts of silver, and were made up of metallic silver particles.

#### Other Interesting Particle Facts Released In The New Peer-Review Study

A number of important scientific finds were reported in the paper concerning the Nano-silver-particles manufactured and patented by Powers International Inc.

**First**, it was found that as the silver product dried, the 5-7 nanometer particles would pull together into clusters, as if they were a single particle (hence particle pictures shown to clients by minor company competitors). The extraordinary discovery was that the silver particles in the clusters don't actually touch, but that the Powers International Inc. silver particles have a very unique charge barrier which pulls them together but does not let them actually touch, holding them within 2-3 nanometers of the other particles in the cluster. It was then found that as water was again added to the clusters, the individual 5-7 nanometer particles “appear to fly away from the core”, again able to act individually to promote health. Other silver products do not have these same unique charges that Powers International Inc.'s products have.

The **second** discovery was that the Powers International Inc. silver particles have a very rare and unique silver coating. Each pure silver particle has a very thin and unusual silver oxide coating, of what is indicated to be  $Ag^4 O^4$ , an  $Ag^2$  oxide. It was determined that this pure silver particle, with both the unique coating and electrical charge barrier, may be what makes Powers International Inc.'s silver products so much more effective than other silver products available on the market.

**Third**, it was found that the Powers International Inc.'s Nano-silver particles emit a resonance or frequency. This resonance is the same frequency as that part of the ultraviolet spectrum that kills microbes. This frequency is unique, like a fingerprint, to Powers International Inc.'s silver products. The company has filed patents on the frequency. The catalytic action of this frequency emitted by the silver particles is part of the reason the Powers International Inc.'s Nano-silver particles continue to function in the body even after the silver oxide coating is stripped away.

A **fourth** and very important fact that was released in the scientific paper was that silver has a “second major use in human health—for the reduction of pain. In this application, the property involved is the high electrical conductivity and chemical inertness of the metal. Pain is reduced in mammals by short circuiting the electrical pain circuits.” It goes on to state; “the two properties of high conductivity and bacterial action are combined when using a silver aquasol,” which is another name for Powers International Inc.'s liquid Nano-silver product.

A **fifth** interesting note was released in the scientific paper. It states at the top of page five, “*We examined some half a dozen commercially available “silver colloid” products from various manufacturers, but we spent considerably more time and attention on the product of Powers International Inc.'s new manufacturer.*” It goes on to state that the reason they chose the products by Powers International Inc.'s manufacturer was because their products were made by an extraordinary process, that is patented.