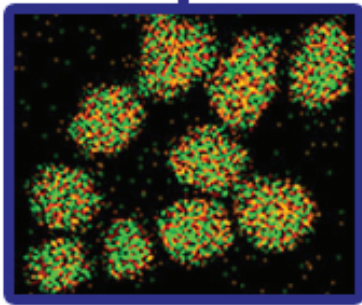


# Silver News

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## A New Silver Alloy Offers Potential Alternative To Palladium

Rhodium Rh 45	Palladium Pd 46	Silver Ag 47
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After nanoprocessing, each particle is 10 nanometers in diameter and behaves similarly to palladium.

HIROSHI KITAGAWA, KYOTO UNIVERSITY

Japanese researchers at Kyoto University say they have created a new alloy that resembles palladium by combining ultramicroscopic metal particles of rhodium and silver.

Usually, rhodium and silver do not mix, but Professor Hirosho Kitagawa and his team were able to combine nanoparticles of each metal in the presence of heated alcohol. The result produced a chemically-stable metal with characteristics similar to palladium.

Kitagawa said that he is applying for a patent for the process, which, if accepted could provide Japan and other users independence from palladium-rich reserves held mainly in South Africa and Russia. Palladium is used in catalytic converters in cars, fuel cells production, medical instruments and consumer electronic items such as flatscreen TVs, computers and mobile phones.

If the Kyoto researchers are able to cost effectively produce this palladium substitute it would be a boost to the consumer electronics industry as well as Japan's automobile manufacturers.

“The result produced a chemically-stable metal with characteristics similar to palladium.”

# Silver Could Replace Chemical Dyes in Wool Coloring

Placing silver particles in textiles has become common practice to help eliminate bacteria and the odors they cause, but two New Zealand scientists are combining wool with gold and silver particles to produce dyes that don't fade even after many washings. Not only do they claim that the dyes last longer than synthetic dyes, but the silver-based dyes are cheaper, don't cause environmental pollution and are non-allergic.

Fern Kelly, the researcher who worked with silver-based dyes (colleague Kerstin Burridge worked with gold) says that silver nanoparticles in New Zealand wool scatter light and emit many different colors including yellow, peach, pink and purple.

“The researchers say there are niche applications including high-end scarves, exclusive apparel and luxury carpets.”

Because the silver binds with the wool, the colors don't fade even with repeated washings. The silver particles also offer anti-bacterial protection and reduce static electricity. “We're looking at the benefits of including the fiber in carpets and also in upholstery on airplanes and public transport—places where textiles get a lot of use, and it isn't practical to clean them all the time,” said Kelly.

While dyeing the wool with silver is cost effective compared to traditional dyeing, not so for the gold dyes. The gold-based wool items are about 100 times more expensive than wool colored with organic dyes, however the scientists believe the initial target for the golden wool is high end fashion accessories, fabrics and floor coverings. The researchers say there are niche applications including high-end scarves, exclusive apparel and luxury carpets.



TOURISM NEW ZEALAND

New Zealand scientists are learning how to dye wool with silver instead of using more expensive synthetic dyes.



ARCTIC SILVER

Arctic Silver 5 keeps electronic components cool, giving better performance and longer life.

## Arctic Silver 5 Cools Computers Safely

### Offers Better Performance, Longer Life

Consumer electronics designers and builders are always seeking ways to lower temperatures inside electronic gear because heat is the enemy of performance and longevity. The traditional approach is to use ‘heatsinks,’ hunks of metal, usually with fins for greater surface area, which are physically joined to the heat-producing component. The heatsink draws heat away to prevent overheating. In the case of computers, the biggest heat producing component in danger of overheating is the CPU or Central Processing Unit, effectively the computer's brain.

Heatsinks present a dilemma, however. Because they are made of metal, often aluminum, they also conduct electricity which can be dangerous to other components as well as computer repairers. One answer is [Arctic Silver 5](#), a thermally conductive silver-based paste used to draw heat away from computer parts onto a heatsink without conducting electricity. It contains 99.9 percent pure silver particles but does not conduct electricity because of additional filler material.

The product comes in a tube which makes it useful for CPUs, because the paste thins out and fills the microscopic valleys between the CPU core and the heatsink. The compound thickens over the next 50 to 200 hours until it becomes stable.

Arctic Silver 5 is compliant with the European Union's Restriction of Hazardous Substances Directive, which regulates the use of certain hazardous materials used in the manufacture of various electrical and electronic equipment in the European Union.

# Silver-Based Test Offers Faster Diagnosis of Pneumonia

## Drops Discovery Time from Days to Minutes

U.S. researchers have developed a technique that can diagnose a common type of pneumonia within minutes, potentially replacing existing tests that can take several days for results, according to Duncan Krause, PhD professor of microbiology at the University of Georgia's Franklin College of Arts and Sciences. "If you can make a positive identification from a 10-minute test, then appropriate antibiotics can be prescribed, limiting both the consequences in that patient and the likelihood that it will spread to others," said Krause.

The test relies on an existing technology called surface-enhanced Raman spectroscopy, a technique that measures the light scattering characteristics from a metal surface, which, in turn, can detect particles on the metal. In medical testing, these particles could be bacteria. Krause and his team were able to enhance the bounced-back signals by using silver nanorod arrays to detect the tiny bacteria in throat swab specimens. The bacteria detected was *Mycoplasma pneumoniae*, which causes atypical or "walking pneumonia," in clinical samples with over 97 percent accuracy. Silver is used because it reflects light extremely well compared to many other substances. Krause describes the nanorod array as a brush with densely packed bristles, where each of the tiny silver rods extends out at a specific angle. The sample, such as bacteria from a throat swab, clings to the bristles, where the spectral signature produced by the laser is amplified and then analyzed by a computer program. He says that infections due to *M. pneumoniae* are very common yet difficult to diagnose. The bacterium is a major cause of respiratory disease in humans and the leading cause of pneumonia in older children and young adults.

Krause said the testing device could be reduced to a size that would fit into a briefcase, although testing is currently done only in a laboratory setting. "Our hope is that when we begin to explore the capabilities of this technology, it can be applied in point-of-care testing," he added. "Then the impact becomes truly significant." Krause hopes to test his technique on other pathogens.

# Silver Promotion Service To Further Expand Savor Silver Website

## New International Designer of Distinction category to be added; Current SilverMark Manufacturer group to be expanded

The Silver Institute's Silver Promotion Service (SPS) is adding a new classification onto its [Savor Silver website](#) and also expanding a current category of participants. Starting in April, the current *Designers of Distinction* category will become *International Designers of Distinction*, a new classification to reflect the increased international focus of the SPS. Concurrently, the number of SilverMark Manufacturers, a category first introduced in 2010, will be increased. To be designated, a 'SilverMark Manufacturer' must have a strong silver jewelry design culture, international distribution, and agree to the SPS's annual terms and conditions regarding utilization of the SilverMark.



SPS Director Michael Barlerin said: "These two enhancements of the site reflect its rapid and continuing evolution. As the overall Savor Silver program has grown over the last two years and expanded beyond its initial US focus, it is only logical that the program become increasingly international. Equally, the increased priority being accorded to the SilverMark Manufacturer category, also with an international orientation, is highly relevant for the SPS and the industry."

These new SPS initiatives follow several implemented in the fall of 2010. At that time, the SPS introduced a country-focused component of the program with its Designers of Distinction from Mexico. Concurrently, the site was modified to give visitors the opportunity to view it in Spanish as well as English.

The goal of the Silver Institute's Silver Promotion Service is to develop and implement programs that enhance the image of silver and stimulate demand for silver jewelry in major markets.



# Silver Threads in Cold Weather Apparel Beat Traditional Warmers

During the cold winter months, some people keep warm by using heated gloves, shoes and vests that rely on a heating element attached to a battery. While this traditional system works, it has drawbacks. For example, the wiring can be unwieldy and the heat is not always distributed evenly throughout the garment. Another way to keep warm is to use chemically-heated pads that fit inside pockets, gloves or footwear. This, too, is an imperfect system, because the pads can't be turned off nor is the heat distributed.

Germany-based clothesmaker [WarmX](#) has a unique twist on heated clothing that offers an independent and rechargeable source of heat that can be switched on and off as required during cold periods while providing heat that is evenly distributed over the entire garment.

The heat is generated directly on the skin by silver-plated polyamide threads that have been woven into the clothes. The threads are supplied with power by a rechargeable battery-operated control unit – about the size of a mobile phone—providing heat for up to six hours at the lowest setting. The WarmX underwear has three settings, 2 watts, 4.5 watts and 7 watts, and can easily be machine washed without affecting its properties. Because the human body generates about 100 watts of heat naturally, these power levels can never burn the wearer. In addition, a power controller monitors the circuitry at all times and turns the unit off if it detects a malfunction. The units also work when wet without danger to the wearer.

Because the battery is worn in a pouch on the underwear, it can operate in extremely cold temperatures without succumbing to the usual power-draining effects of cold from which batteries suffer.



Nearly 50 percent of these warming tights consist of pure, silver-plated thread which carries heat throughout the garment.

WARMX

HOHENSTEIN INSTITUTE



Hohenstein researchers carry out field study into the effect of antibacterial clothing on skin flora and microclimate. Trials show that the natural skin flora is unaffected even after long periods of wear.

flora. Institute scientists said that even though silver has been used for centuries as an antibacterial agent, recent controversies over its safety in textiles have been reported in the media, leading some consumers to be reticent about buying and wearing clothes containing nanosilver which is mainly used to prevent odor-causing bacteria to flourish.

Sixty healthy volunteers took part in the six-week trial. Special T-shirts were made for the survey, with an antibacterial treatment on one side (verum), while the other side served as a non-antibacterial placebo. The researchers found that the skin flora and microclimate of healthy skin remained unaffected by the antibacterial T-shirts that were worn next to the skin. There was no change to the total number of bacteria on the skin or variation in the range of bacteria. Nor was there any change to the microclimate, the vapor area between the skin and the garment.

These results have led the researchers to conclude that antibacterial textiles could be classified as safe. On the other hand, the researchers noted that the antibacterial textiles were still effective against bacteria entering the fabric in perspiration, as shown in previous studies.

The study concluded: at no time did any pathogenic bacteria occur; the individual differences between the volunteers were all within a normal range when compared with data on skin flora in the scientific literature; and no effect by the textile fibers on the skin flora could be detected either in individual volunteers or when the whole group or parts of it were considered.

The study also looked at the thin layer between the surface of the skin and the textile-to-skin microclimate. This layer develops its own specific moisture level, air flow and temperature, depending on the fibers and construction of the textile. It not only affects the level of comfort that the wearer experiences, but also the living conditions for the skin flora. The researchers found that there was no significant effect on vapor loss from the skin on either the verum or placebo sides and concluded that the antibacterial fiber had no effect on the skin barrier. The results showed equally little change in the pH or moisture levels of the volunteers' skins. None of the trial's participants showed any dermatological changes, such as increased dryness or inflammation.

The research project was financed by the German Federal Ministry of Economics and Technology through the Federation of Industrial Research Associations. The Institute researchers plan to submit the study for publication.

# Hohenstein Institute Study Shows Skin Not Affected by Antibacterial Clothing

The Hohenstein Institute in Bonnigheim, Germany has completed a large-scale field study of nanosilver's effect on skin showing that antibacterial textiles can be considered safe. Tests showed that while the nanosilver killed odor-causing bacteria, it did not damage naturally occurring skin

# Upcoming Events and Industry News

Silver Institute to release the *World Silver Survey 2011* on April 7 in New York City, April 8 in Mexico City. Please contact the Silver Institute for ordering information.

## Harman Applying Silver Halide Experience to Antimicrobial Business

With the worldwide decline in the silver-based photography business, Harman Technology Ltd. of Knutsford, England is using its knowledge of silver halide to move into the antimicrobial industry. “We have the advantage of 130 years of knowing how to grow silver halide crystals,” said Chairman Howard Hopwood. “We can grow them in a very controlled way from 20 nanometer to 2 microns and beyond... any shape, any size.”

“We have the advantage of 130 years of knowing how to grow silver halide crystals,” said Chairman Howard Hopwood.

He noted that they can produce ‘core shell crystals’ which consists of silver iodide crystals in the middle, with silver bromide crystals around that and silver halide on the outside. “This offers a range of solubilities for the crystals,” he said. The crystals can be imbedded in materials which would then have antimicrobial characteristics.

Harman Technology Ltd was formed in 2005 by six former managers of ILFORD Imaging UK Limited. The Company acquired facilities at Mobberley, England, where ILFORD products have been designed and manufactured for many years. Harman continues to manufacture and sell the ILFORD brand of black and white photographic products.

## Ferro to Expand Silver Powder and Flake Capacity to Meet Increasing Industrial Demand

Ferro Corporation’s Electronic Materials business is expanding production capacity for electronic grade silver powder and silver flake at its South Plainfield facility in New Jersey, according to company officials. They expect to increase silver powder production capacity by 30 percent with upgrades slated to be completed by July.

Global demand for electronic grade silver powder and flake with ultra-fine particle size is growing in many industries and product lines including solar panels, high-definition displays, membrane touch screens, and semiconductor components. The small particle size enables the printing of extremely fine conductive lines.

“This capacity expansion and upgrade will enable Ferro to meet our customers’ increasing demand for electronic grade silver products,” said Michael J. Murry, Operating Vice President of Ferro’s Electronics, Color and Glass Materials Group. “Ferro is committed to providing leading edge products for advanced technology industries. This investment will allow us to better serve these important growth markets.”

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