

Silver News

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Silver Helps 'Nanofish' Swim



Click the image to watch the nanofish swim.

The nanofish is composed of gold and nickel segments held together by silver hinges.

For several years, doctors have directed drugs to specific parts of the body – such as organs with tumors – by attaching them to tiny pieces of silver and aiming them toward the target. Silver makes an ideal conduit because it doesn't harm the patient and does not interact with most medicines. For example, using so-called 'silver bullets' is an accepted way of delivering chemotherapy to those suffering from prostate cancer.

Now, scientists are experimenting with a new way of getting drugs into patients using 'nanofish,' and silver may play a vital role in the technique.

A team of researchers from the Harbin Institute of Technology in China and the University of California in the U.S. has developed a nano-sized fish that is able to swim in liquids with its path directed by a magnet. Previous approaches have focused on tiny mechanisms that mimicked the way bacteria move with a spiraling corkscrew-like tail. This new approach imitates the way fish swim by swinging their tail side to side.

The nanofish is composed of gold and nickel segments held together by silver hinges. Silver has the durability and flexibility to move without breaking even at nano sizes. Each segment is 800 nanometers long and each fish is a hundred times smaller than a grain of beach sand. The researchers describe the fish in their article titled *Magnetically Propelled Fish-Like Nanoswimmers* in a recent issue of the journal [Nano Small Micro](#): "The resulting nanofish consists of a gold segment as the head, two nickel segments as the body, and one gold segment as the caudal fin, with three flexible porous silver hinges linking each segment."

By applying a magnetic field, the head and tail swing side to side giving the fish its forward motion. Its speed and location can be controlled by the position and speed of the magnet.

More development is needed, the researchers say, including a tracking system that would allow for precise steering of the nanofish. They also want to learn the best way to get rid of the swimmers after they've delivered their medicine.

Elizabeth Hunt Interview

Elizabeth Hunt is Operations Director at Allied Gold, Ltd. in London, owner of the patents and trademarks for Argentium Silver, and has worked in the jewelry and giftware trade for over 30 years. Her career has encompassed international product development manager for jewelry and ceramics company Josiah Wedgwood, ten years of running her own outsourcing business to the jewelry and ceramics industry, and head of design and sourcing for Gems TV based in Bangkok.

In 2014, she was named one of the “Hot 100 business big shots” in U.K.’s *Professional Jeweler* magazine.

Following is an edited interview with Ms. Hunt.



Elizabeth Hunt

Silver News: What is Argentium Silver? Please explain about the four alloys that are available.

Elizabeth Hunt: Argentium Silver is a patented and trademarked range of premium silver alloys containing germanium. There are two alloys which are .935 purity and two which are .960 purity; each having an alloy designed specifically for casting and for mill-formed products, i.e., sheet, wire, tube, etc.

The alloys are tarnish resistant and this is only one of the attributes of this metal.

Argentium, like all high grade silvers, is antibacterial, however the addition of the germanium in the alloy appears to increase its hypoallergenic properties by forming a barrier over the copper phase in Argentium. We have seen some consumers that have difficulty wearing sterling silver without a reaction but who are able to wear jewelry created in Argentium.

The Argentium alloys are the whitest of all the white precious metal alloys as measured by the CIELAB system [A color space defined by the Commission Internationale de l’Eclairage]. They do not require plating, reducing both manufacturing processes and costs and the effect of plating chemicals on the environment. Argentium is firestain free and can be heat hardened post production to create a more durable finish.

SN: Allied Gold bought the patents and trademark for Argentium in 2014. What attracted you to the product? Have you committed to any R&D efforts to further develop the material?

Ms. Hunt: When Allied Gold bought the patents and trademarks in 2014, we knew that the true scope and potential of this alloy had not been fully realized or promoted broadly. For our own business in London it was not just the anti-tarnish properties which were of interest, but also that the alloys have great fusing properties.

The fusing properties of Argentium enable faster production and innovative designs. Seams and joints become invisible when fusing Argentium and reduce solder clean-up time. Argentium can also be fused to all carats and colors of gold and palladium. We have been manufacturing commercial production lines of two color wedding rings (our core business) for around 18 months and the business has grown. Furthermore, we have invested a great deal in R&D to ensure the alloys are robust and can be produced easily by our global partners.

SN: How is it produced – where and by whom?”

Ms. Hunt: Argentium is manufactured in much the same way as any other silver alloy, whether in master alloy or in grain for casting or mill production. The production parameters need to be controlled more rigidly than sterling, but with modern equipment and production processes this is easily achieved.

Currently we are working with a range of partners globally: The

Pallion Group in Australia, Hereaus in Hong Kong, GSM in the USA and Legor in Italy with others to come.

SN: What do you believe are its main applications? Discuss responsible silver aspects.

Ms. Hunt: Argentium is highly tarnish resistant, not tarnish proof, but when tarnish does occur, which will be over an extended period, it can be easily removed making Argentium great for both retailers and consumers. We have had independent testing run by CATRA here in the UK for a range of Argentium cutlery and it passed a full range of dishwasher testing. No other product has achieved such results.

We are currently working with the Birmingham Assay office laboratory and will be running more independent testing to further endorse the unique selling points of this metal.

One of the other mechanical properties that many of our customers in the watch, pen and jewelry industries have benefitted from is the fact that Argentium can be heat hardened post production. This allows clients to produce items which simply would not be possible in standard silver. Items that are fully soft after soldering can easily be hardened by a simple low-heat treatment and without the use of high-tech equipment. Items such as sprung bangles and watch cases along with pen tubes and clips are now durable, retain their spring and have a lasting superior color and durability.

Silver flutes have also been produced and the fusing of the keys rather than the traditional use of lead solder has reduced the maintenance costs. In addition, an improved sound projection has been achieved from using the unique low heat hardening process with Argentium silver

The corporate Argentium silver site www.argentiumsilver.com and the Argentium Guild site www.argentiumguild.com allow users to register to use the Unicorn trademark to endorse their work, discuss production techniques with other users via a discussion forum and keep up to date on news and events around the globe. Additionally, there are downloadable technical and marketing sheets.

Argentium is manufactured from ethically-sourced silver and alleviates the use of harsh chemicals for cleaning as it is firestain free and does not need to be plated to retain its color and luster.

SN: What are your plans to market and sell it in the coming months and years?

Ms. Hunt: Argentium International is working on expansion plans for 2017 and beyond that will see business grow considerably in all continents. Our new business partners will be actively supported by global web-based marketing campaigns which recognizes our growing network of like minded, high-quality producers able to drive sales of our alloys. We believe the coming months and years are going to be very exciting.

Antibacterial Reusable Bags from U.K. Supermarket

U.K. supermarket chain Marks & Spencer is selling silver-imbedded, reusable shopping bags to help cut down on the growth of bacteria and its accompanying odor in bags that are used by consumers to carry their groceries.

Many consumers have turned to reusable bags in response to a 5 pence charge for disposable plastic bags that took effect last October. The charge has been successful in reducing by 85 percent the number of disposable bags used by consumers, according to government figures.

Some scientists have warned that reusable bags can harbor dangerous bacteria, especially from meat and poultry. (See [Silver Helps U.K. Poultry Packager Take Aim at Bacteria](#), *Silver News*, August, 2016) According to a [test](#) conducted for the *Sunday Post* in Dundee, Scotland, by Glasgow Caledonian University's School of Health and Life Sciences, "reusable bags are often heavily contaminated with bacteria that could cause illness." In their test, four of nine bags fell into the heavily contaminated category. According to Professor Charles Gerba at the University of Arizona, who also studied the issue: "Our findings suggest a serious threat to health, especially from bacteria like *E.coli*, detected in half the bags sampled. Consumers are alarmingly unaware of these risks and the critical need to sanitize their bags weekly."

An M&S official said that their new bags had been in the works for four years. "We offer a wide choice of reusable shopper bags – currently up to eight different styles in store – and in May, 2016 we started to introduce the anti-bacterial 'silver technology' into this range as an additional feature for our customers," the official noted in a prepared statement.

The M&S bags use [Biomaster technology](#) and are sold at cash registers starting at 90 pence for the smallest of three sizes.



BIOMASTER

Biomaster silver technology used in reusable shopping bags like this one eliminate bacteria and odor – and they are machine washable.

'Smog Free Tower' Cleans Air; Turns Pollutants Into Jewelry

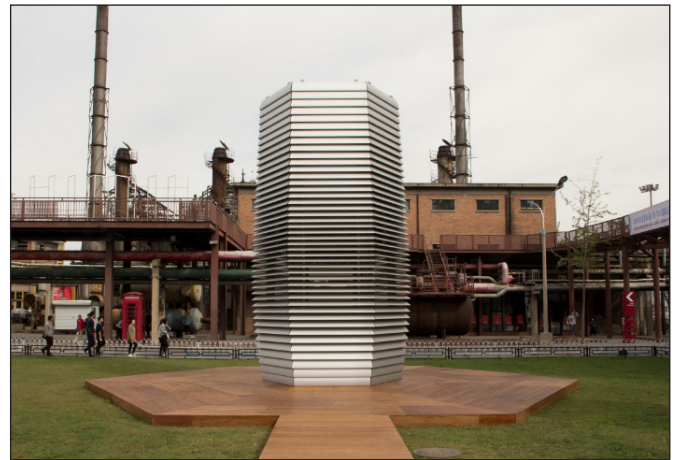
Beijing has some of the world's most polluted air, but the newly-installed 23-foot tall *Smog Free Tower*, which uses silver-plated fins to help clear the air, not only traps pollutants but also turns them into jewelry pieces.

The tower is part of the *Smog Free Project*, initiated by Dutch artist and designer Daan Roosegaarde and supported by the Chinese Ministry of Environmental Protection. The tower was installed in a Beijing park in September and is expected to travel to other countries as an example of how cities can help mitigate pollution.

Roosegaarde describes the structure as "the largest electronic vacuum cleaner in the world" because it sucks in polluted air, collects the smog particles and produces a bubble of clean air around it. The exterior consists of 45 silver-plated metal fins that are similar to Venetian blinds. The fins allow the tower to be open to the outside air while keeping the internal mechanism protected from rain. The silver plating protects the fins from tarnishing due to pollution and moisture.

Each day, the tower filters and then compresses enough smog to produce a handful of cubes which the artist gives away as free souvenirs. Roosegaarde has also used the compressed smog to make jewelry items such as rings and cufflinks which he gives away to financial supporters of the project.

Before coming to Beijing, the tower was installed in Rotterdam.



DERRICK WANG

Click the image to watch a video.

SilvaClean Shown to Reduce Bacteria in Hospital Sheets and Gowns

Treating hospital textiles with SilvaClean, an ionic silver-based antibacterial, reduced total microbial contamination before patient use by 88% for sheets and 89% for patient gowns. Even after patient use, the total bacterial counts dropped 30% on sheets and 45% on gowns, according to a [peer-reviewed article](#) in the September issue of the *American Journal of Infection Control* (AJIC).

Moreover, the treatment produced a 100% decrease in *Staphylococcus aureus* on sheets and gowns before patient use and decreases after patient use of 74% on sheets and 89% gowns. The test was conducted at three different California community hospitals determine the effectiveness of SilvaClean when applied to linens after each washing.

The authors of the paper noted: “The reduction in bacterial contamination with silver in post patient use textiles indicates that silver treatment continues to reduce bacteria, including *S aureus*, over the extent of the patient’s hospitalization.” The researchers were not able to draw definitive conclusions about the dangerous MRSA ‘superbug’ bacteria because of its low prevalence at the study sites, but they wrote: “Our results show a trend toward decreased MRSA isolation in both sheets and gowns after silver application, but this reduction was statistically significant only on gowns.”

Hospital acquired infections kill nearly 200 people in the U.S. every day and affect 1 in 25 hospital patients, according to the U.S. Centers for Disease Control & Prevention. These numbers do not include infections acquired at skilled nursing, long-term acute care and outpatient surgery facilities.

“The data confirms that SilvaClean is a leading technology for hospitals to help rapidly establish the cleanest possible environment and confidently maintain it over time,” said Bill Morris, Co-founder and Director of Efficacy and Chemistry at Applied Silver, the maker of SilvaClean, in a prepared statement. “A cleaner environment is the essential platform that allows hospitals to meet stringent performance targets and offer the comfortable, low-risk bedside experience that patients now expect.”

SilvaClean was developed by [Applied Silver, Inc.](#)

‘Chrome Nails’ Hottest Celebrity Trend

They’re called ‘chrome nails’ but they’re really made from silver.

One of the hottest fashion accessory this season may be fingernails that shine with the help of silver powder mixed with polish and offer a highly-reflective surface. According to trend watcher *The Inquistr*, chrome nails are poised to surpass Minx Nails as the latest trend in celebrity fingernails. Minx Nails are a flexible polymer film that applies like a sticker when heated. They are touted as mess free and a more environmentally-friendly alternative to nail polish and fake tips. However, chrome nails are easier to apply at home, which offers a greater consumer draw.

The polish achieves its highly reflective surface by applying layers of base coats and colored polishes set by ultraviolet light boxes, which, until recently, were only available in nail salons. After several applications, silver powder is brushed on and buffed to a mirror-like finish.



[Click the image to watch a video.](#)

Artist Taps Nanosilver for Her Works

Kate Nichols, artist-in-residence at the University of California at Berkley, is using silver nanoparticles in her creations, some of which pay homage to an early photographic technique known as daguerreotypes in which images were imprinted on glass coated by silver particles.

Of her piece titled *Visible Signs of Indeterminate Meaning 14*, Nichols writes: “These small works on glass have affinities with images created by 19th-century technologies for making visible the invisible - the products of spirit photography, telescopy, and x-rays. Their reflective, changeable nanoscopic-silver surfaces share qualities with daguerreotypes, one of the earliest forms of photographs. Both are made of silver; these, with nanoscopic silver I made in a lab.”

Nichols began looking at how nanostructures can be employed as art when she studied the colored wings of the Morpho butterfly. She noticed that the hues didn’t come from pigments but were structural. She says in a video (click screenshot to play) that this inspired her to try to produce color by using silver nanoparticles instead of with traditional pigments. “Because they’re so small, they have a different relationship with light than large chunks of silver do. At the nano scale, size and shape have a profound effect on color and so does the position of materials in relationship to the light and the viewer.”

Some of Nichols works have been featured on the cover of the journal *Nature*, on the TED stage (Technology, Entertainment and Design conferences), and in the permanent collection of Salt Lake City’s Leonardo Museum.



Click the image to watch a video.

Larry Kahaner
Editor

www.silverinstitute.org
[@SilverInstitute on Twitter](https://twitter.com/SilverInstitute)

THE
SILVERINSTITUTE

1400 I Street, NW, Suite 550
Washington, DC 20005
T 202.835 0185
F 202.835 0155