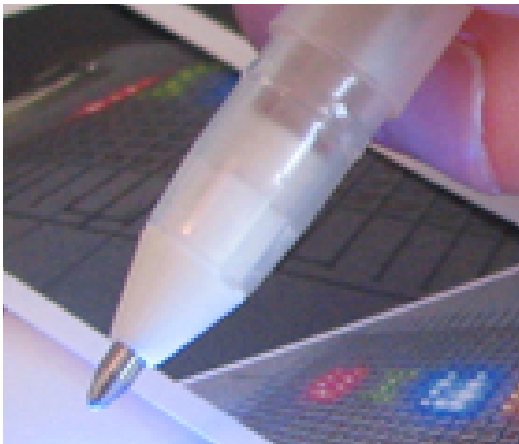


Silver News

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Rollerball Pen With Silver Ink Builds Circuits “On-The-Fly”



A rollerball pen filled with silver ink can produce electrical circuits just by writing.

University of Illinois at Urbana-Champaign

Silver inks have been around for a while, but engineers from the University of Illinois at Urbana-Champaign have made their application as simple as writing with a pen.

The engineering team removed the standard ink cartridge from a roller pen and replaced it with conductive ink made from a concentrated mixture of silver particles, a solvent and a small amount of polymer. The silver ink is formulated to have the same consistency as commercial ink so it matches the pen's flow behavior, according to Jennifer Lewis, director of the Frederick Seitz Materials Research Laboratory at the University, who led the development.

By writing with the pen, they were able to produce silver lines which became electrical circuitry.

“Pen-based printing allows one to construct electronic devices ‘on-the-fly,’ ” said Lewis. “This is an important step toward enabling desktop manufacturing (or personal fabrication) using very low cost, ubiquitous printing tools.”

One of the tests that the engineers carried out involved sketching a house, trees and Chinese text from a painting. The ink became wiring for an LED mounted on the roof with a battery connected at the edge of the painting. The team also used the pen to produce an RFID antenna, like those used in merchandise tags.

The ink maintained its conductivity despite many bends and folds in the paper.

With the price of silver around \$40 an ounce, the pen could cost around \$60 if produced commercially. However, because one pen can draw many circuits, each use might cost less than a dollar. Lewis estimates that the pen could go into production in one to two years, but his group has not yet taken steps in that direction, because they want to continue their experiments. For example, they want to produce a pen that writes finer lines.

The researchers also are expanding their tests to include different ink colors and different surfaces. Their work was supported by the U.S. Department of Energy.

New Product Line Prevents Silver Tarnish

[Tarnish Tamer](#) is a new line of anti-tarnish silver care products that prevent tarnish build-up on a wide range of silver and other metals by placing the items inside special bags or in containers holding Tarnish Tamer fabrics.

According to company officials, the Tarnish Tamer works by absorbing and neutralizing tarnish-causing gases. The product does not depend upon heat or humidity and does not coat silver items with any chemical or oils. Tarnish Tamer products can be stored for up to 3 years in a sealed container before being put to use.

The new product line includes anti-tarnish strips, drawstring pouches for jewelry, a silverware roll, and a 15 x 15-inch zipper top bag for larger silver pieces such as bowls or candlesticks. Polishing is not needed for up five years, the company said.



Tarnish Tamer can prevent tarnish from forming on silver objects.

TARNISH TAMER

Tarnish Tamer products will be sold in US stores for US\$6.49 - US\$17.99.

Metals Exchanges Focus on Chinese Traders

The Hunan South Rare and Precious Metal Exchange has just opened in central China's Hunan province in Yongxing County.

The area is known as the 'Silver City of China' because of its abundant silver output, about 25 percent of the country's annual silver production, according to Cao Minghui, general manager of the Exchange.

At the opening ceremony, Cao said the exchange's goal is to reach 1 trillion Yuan in annual trading volume by the end of 2015.

In a related story, the [Hong Kong Mercantile Exchange](#) (HKMEX) has begun trading a dollar-denominated silver futures contract. The silver contract will trade in lots of 1,000 ounces and be delivered in Hong Kong, the exchange said in a statement.

"The new contract will enable buyers and sellers in China to trade effectively with their counterparts across the world, while at the same time allowing investors to gain exposure to silver price movements and broaden their investment portfolio," said HKMEX president Albert Helmig in the statement. He noted that silver demand rose 67 percent in China and 17 percent globally between 2008 and 2010.

Silver *In* Stainless Steel Instead of *On* It Kills Germs Longer

University of Birmingham (UK) scientists have figured out a way to make stainless steel surfaces bacteria resistant by infusing silver into the surface rather than coating it.

By imbedding the silver into the stainless steel the metal not only kills germs but is resistant to the wearing away of silver during cleaning and usage.

"Previous attempts to make stainless steel resistant to bacteria have not been successful as these have involved coatings which are too soft and not hard-wearing," said Hanshan Dong, Professor of Surface Engineering at the University of Birmingham and lead investigator. "Thin antibacterial coatings can be easily worn down when interacting with other surfaces, which leads to a low durability of the antibacterial surface. Our technique means that we avoid coating the surface; instead we modify the top layers of the surface."

The team developed a surface alloying method using Active Screen Plasma (ASP) technology. By combining sputtering, back-deposition and diffusion they introduced silver into a stainless steel surface, along with nitrogen and carbon. The silver acts as the bacteria-killing agent and the nitrogen and carbon make the stainless steel much harder and more durable.

The researchers also replicated the cleaning process for medical instruments in hospitals. After cleaning the treated instruments 120 times they found that the antibacterial properties of the stainless steel were still intact and the surface still resistant to wear. So far, they have been able to produce stainless steel surfaces up to two meters by two meters. They hope to make larger areas.

"Our technique means that we avoid coating the surface; instead we modify the top layers of the surface."

Silver Diamine Fluoride Helpful in Preventing Childhood Cavities

Current cavity-preventing treatments such as sodium fluoride and calcium phosphate only are effective in decreasing the spread of cavities in tooth enamel which is on the tooth's surface. Now, research has shown that Silver Diamine Fluoride or SDF may prevent childhood cavities in the dentin itself—the layer below the surface enamel, according to recent studies.

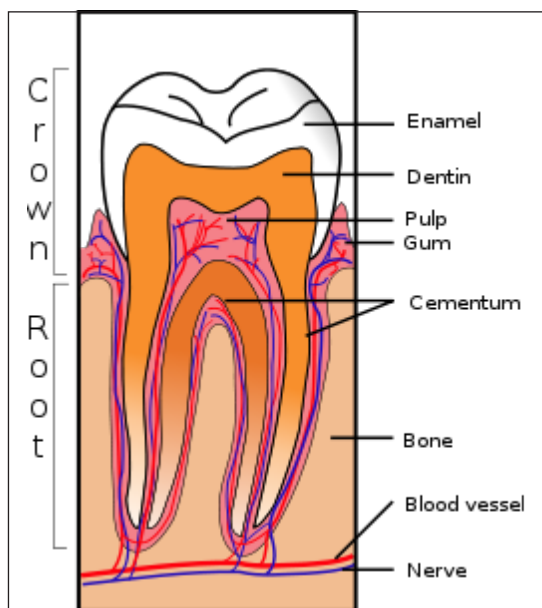
SDF acts in several ways. First, the silver kills bacteria and prevents new biofilm in the dentin. Second, silver combines with fluoride to produce fluorapatite, a component of tooth enamel which strengthens the tooth's outer surface.

A study in Chile shows that SDF was 80 percent effective in fighting cavities in baby teeth and 60 percent in permanent teeth. In China, a study showed that children treated with SDF had reduced cavities compared to those who received sodium fluoride. A Peruvian study found that in addition to arresting cavities, SDF reduced tooth sensitivity, which is a common problem associated with deep dental cavities.

A [recent critical summary](#) from the American Dental Association concluded: "Silver diamine fluoride is more effective than fluoride varnish at arresting active caries and preventing new caries. SDF is equally as safe as fluoride varnish."

SDF application is simple. After teeth are brushed, one drop of SDF is placed on the cavity for several minutes. The child may not eat or drink for one hour.

Research in the US and elsewhere is ongoing, and SDF is under review by the US Food and Drug Administration.



Silver Diamine Fluoride can help prevent cavities in the dentin layer of teeth—not just on the enamel surface.

Wheeler Retires at Coeur after 33 Years of Service

Dennis E. Wheeler has retired as President, CEO and Chairman of the Board of Directors of Coeur d'Alene Mines Corporation after 25 years as CEO and 33 years as a director.



Wheeler is a former president of the Silver Institute, director of the National Mining Association and the World Gold Council. Wheeler will continue to serve the company as a consultant until July 2012.

Wheeler led the mining company through the challenging period of low silver prices in the 1980s and 90s to become the largest U.S.-based primary silver producer with three new world-class, long-lived silver and gold mines, which are generating record production, revenues and cash flow, according to company officials.

Mr. Wheeler has been at the forefront of efforts to improve mine safety and was the first recipient of the International Society of Mine Safety Professionals' Leadership Award. As an industry pioneer and leader in environmental stewardship, Mr. Wheeler earned the highest award from the American Institute of Mining, Metallurgical and Petroleum Engineers, the Environmental Conservation Distinguished Service Award, that association's highest environmental award.

"Dennis has been a leader in the silver industry for over three decades. We will miss his leadership and counsel at the Silver Institute, where he served for nearly 25 years in various capacities, including positions on the Board of Directors and the Executive Committee," stated Michael DiRienzo, Executive Director.

Wheeler is replaced by President and CEO Mitchell J. Krebs who was also elected a director. Robert E. Mellor was elected as non-executive Chairman of the Board.

Upcoming Events and Industry News

China International Silver Conference Slated for October

Registration is open for the 10th China International Silver Conference (CISC), which will be held in Chongqing, China, from October 19 - 21, 2011. Attendees will include government officials, silver industry organizations, leading global silver mining companies, refiners, manufacturers, investors and traders.

The CISC has become an essential international silver conference for market participants and offers attendees an excellent forum for networking and learning more about the increasingly important role that China plays in the silver market; China is the world's third largest silver mining country. The conference is open to all, and foreign participation is greatly encouraged by the conference organizers and sponsors.

Some conference topics will include:

- Present and Future of Chinese Silver Imports and Exports Policies
- The International Silver Markets – A Review of Current Supply/Demand
- The Influence of China's 12th Five-Year Plan for the Silver Industry and the Nonferrous Metal Industry
- Silver Industrial Demand and New Uses
- The Reincorporation of Precious Metals into Financial Society
- Margin Requirements for COMEX Silver – Why are they Necessary?
- Silver Jewelry of the Ethnic Minorities in Southwest China
- The Current World Economy and the Future of the RMB
- International Financial Markets –the Debt Crises in Euro Zone Countries and its Influence on Precious Metals
- Japan's Platinum and Silver Industrial Supply/Demand

In addition, there will be a panel discussion on the global silver industry featuring CEOs of silver mining companies and financial experts. Topics will include: Silver Supply in Mexico, Mining Investment in North America and Opportunities for Chinese Investors, and Risk Control in Silver Investments.

The conference is sponsored by the China General Chamber of Commerce, the China Chamber of Commerce of Metal, Minerals & Chemicals Importers & Exporters, the China Nonferrous Metals Industry Association, the Gems & Jewelry Trade Association of China, the Chongqing Municipal People's Government, and the Silver Institute. The Conference is organized by the Shanghai White Platinum and Silver Exchange.

The CISC conference site is twenty minutes from the Chongqing airport. Conference registration will take place on October 19, with a welcome reception/dinner that evening. The speakers' program will encompass a full day on October 20 and a half-day

on October 21. For more information on the CISC, and to register for the event, visit the conference web site at:

<http://www.china-silver2011.com/en/>

New Silver Sintering Technique Increases Production

[Henkel Electronic Materials](#) has announced a silver sintering technology that enables high volume production of modern power packages in a process that does not require pressure. Sintering is a process in which powders are heated to just below their melting point until their particles adhere to each other.

The first application is in Ablestik SSP2000, a high-reliability, die-attach material suited for products such as high-power LED packaging.

Conventional silver sintering is achieved by applying both heat and pressure to the material, or device, until the metal joint is formed. The drawback to the pressure application technique in semiconductor packaging is its volume limitation, because devices must be processed individually. With Ablestik SSP2000, silver particles are joined with a surface tension mechanism, so the pressure requirement is eliminated and the material can be cured in a standard batch oven at a temperature as low as 200°C.

“The ability to now exponentially increase [output] from traditional silver sintering techniques at roughly 30 to 6,000 units per hour with this technology is incredible,” said Henkel's Michael Todd, Vice-President of Product Development and Engineering. “Now, semiconductor packaging specialists can have high volume and high reliability with a silver sintering material.”

Silver Nanopowder Market to Grow

The market for silver nanopowders is expected to grow 85 percent annually to \$300 million by 2016, according to an analysis by [NanoMarkets](#). Growth will be at the expense of silver powders and flakes.

“The traditional silver powders and flakes business is being shaken up by the commercialization of silver nanopowders and nanostructures,” the report noted. “The arrival of these silver nanomaterials is enabling addressable markets for silver inks and powders to be expanded. Nanosilver powders promise to become a potent new antibacterial preparation, for example. And nanosilver inks have the potential to take printed electronics from the age of the membrane switch to the age of the printed sensor and backplane.”

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