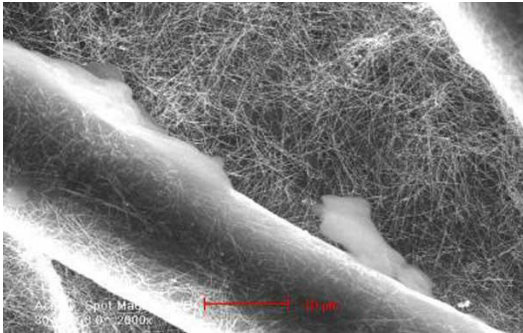


Silver News

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Low-Cost Water Purifier Works Even Faster With Jolt of Electricity

Silver Keeps it Free Flowing and Bacteria-Free



YI CUI, STANFORD UNIVERSITY

Cotton fibers dipped in silver nanowires can filter water 80,000 times faster than current water purifiers.

“The filter has the added advantage that it does not clog as easily as currently-used filters with smaller pores, a problem known as *biofouling*”

Silver-imbedded filters have become popular in recent years in developing countries for purifying water clean enough to drink. Indeed, these low-cost, earthen-ware purifiers – which often can be produced on site from clay - have been crucial in the survival of many rural towns and villages, with silver playing an integral role in keeping the filters and containers germ free. Now, researchers from Stanford University in the heart of Silicon Valley have improved on these simple devices by adding low-voltage electricity.

By immersing plain cotton cloth in a liquid containing silver nanowires and carbon nanotubes, the researchers have developed a low-cost filter that uses low-voltage electricity – obtained from a car battery for example – to produce water 80,000 times faster than using a filter alone to trap pathogens.

According to Yi Cui, Associate Professor of Materials Science and Engineering, instead of trapping bacteria, as most filters do, and slowing down the purification process, the new filter is less dense, allowing water to move through more quickly, but pathogens are still killed by electricity and the silver nanowires. Tests conducted by Cui and his team showed that 98 percent of E-Coli bacteria were killed by 20 volts of electricity during a few seconds of exposure.

Cui’s research group teamed with that of Sarah Heilshorn, an assistant professor of materials science and engineering, whose group brought its bioengineering expertise to bear on designing the filters, according to the *Stanford News Service*. “In the days before pasteurization and refrigeration, people would sometimes drop silver dollars into milk bottles to combat bacteria, or even swallow it,” Heilshorn said. Cui’s group knew from previous projects that carbon nanotubes were good electrical conductors, so the researchers reasoned that the two materials in concert would be effective against bacteria. “This approach really takes silver out of the folk remedy realm and into a high-tech setting, where it is much more effective,” Heilshorn said.

Although their tests used a 20-volt electrical source, Cui said that a 12-volt car battery would probably work as well and that solar energy or a small generator run by a stationary bicycle on blocks or even a hand crank could also produce enough power to run the water purification filter.

The filter has the added advantage that it does not clog as easily as currently-used filters with smaller pores, a problem known as *biofouling*. Any bacteria that lingered on the cotton filter would be killed by the silver.

The research was funded by the King Abdullah University of Science and Technology (KAUST) in Saudi Arabia. A paper describing the work was published by The American Chemical Society’s Journal [Nano Letters](#).

Silver Inks Offer TV Viewers Crystal Clear Pictures

By Samuel Etris, Senior Technical Consultant to The Silver Institute

Most flat panel TV viewers have little idea of the role that invisibly small silver circuits have in making their pictures sharp and clear.

The television's silver circuits, which look like fine window screen patterns, are photographically printed on the back of the front panel and the front of a second, with a conductive gas between the two. On a signal from the back power panel, an electric current charges the conductive gas which produces a specific colored light. This particular light, combined with thousands of others, form the complete colored pictures that we see.

Photographically printed silver inks have made possible the miniaturization of electronic circuits for televisions and other consumer electronic devices. Billions of plasma display panel (PDP) TV screens and consumer electronic devices make up a significant proportion of the 158.1 million ounces of silver consumed by electronic devices in 2009 throughout the world, according to The Silver Institute's *2010 World Silver Survey*.

The Survey noted: "Silver conductive inks for photographically printed electronic circuits that provide low-cost production for touch screens and organic light emitting diodes is a market set for explosive growth." It reports the consumption of silver for the printed electronics circuit market is expected to reach US\$10 billion by 2012 and as much as \$300 billion by 2025. "These nanosilver inks can offer higher resolution, improved performance, and reduced material usage compared to thick film silver pastes, opening the door to substantial markets for these silver inks that would not be available to conventional silver pastes."



Thinly applied silver pastes give flat panel monitor images their clear and crisp look.

New, Healthy Life for Old Computer Monitors

UK scientists have found a healthy use for old computer and television LCD screens. The screens of LCD (liquid crystal display) monitors consist of two sheets of plastic filled with a chemical compound called polyvinyl-alcohol (PVA). PVA is often used in medicine as tissue armatures that help support the body's tissue structures while they are regenerating. Researchers found that by recovering PVA from recycled LCD screens and adding silver nanoparticles the resulting compound product can destroy bacteria like *E. coli* and *Staphylococcus aureus*.

According to Dr. Avtar Matharu at the University of York, by adding silver particles to the PVA, the structure exhibits anti-bacterial properties that can help heal injured tissues. With billions of LCD screens being discarded all over the world, Matharu says that this anti-bacterial product made from recycled materials could aid in turning this e-waste into a useful medical tool. His team will now test the PVA product against well-established anti-bacterial products to determine its efficacy and cost effectiveness.



Millions of discarded LCD monitors may find new life as germ fighters.

9th Annual China International Silver Conference Slated for October

The China International Silver Conference (CISC) is now accepting registrations for the 2010 event to be held in Beijing, October 15-17. The conference will take place at the Fragrant Hill Empark Hotel, located 30 minutes from downtown Beijing and the international airport. Over 400 delegates are expected to attend, according to conference officials.

“China is the world’s third largest silver producing country, and its prominence in the market makes attendance at this conference essential for those wishing to do business in China,” said Michael DiRienzo, Executive Director of the Silver Institute. “The Silver Institute is proud to be a sponsor of this important event.”

The conference will begin on Friday, October 15, with a welcome dinner. The following day and a half will be devoted to the speakers’ program, which will feature a range of presentations from senior Chinese government ministers to leading experts on the global silver market discussing a range of timely topics.

The full conference program and registration information can be found [here](#).

The conference is hosted annually by one of five associations that rotate serving as the host organization. This year’s host will be the Gems and Jewelry Trade Association of China, and co-sponsored by the China General Chamber of Commerce, the China Nonferrous Metals Industry Association, the China Chamber of Commerce of Metals, Minerals & Chemicals Importers and Exporters, and the Silver Institute. The Beijing Anti-Info Information Development Company is organizing the Conference.

Flint Teams With Biomaster for New Silver Coatings

The Luxembourg-based [Flint Group](#) has developed an antimicrobial coating, incorporating [Biomaster](#) silver-based additives that can be applied to most materials using all major printing methods, according to company officials.

The antimicrobial coatings can be applied by methods such as flexo, gravure and UV, according to Flint’s Commercial Director, Mark Sutton. He adds that Biomaster’s products contain about 10 times more silver than most other silver-based biocides, which means that less product can be used for the same effectiveness. The coatings will be used for hospital equipment, worktops or keyboards.

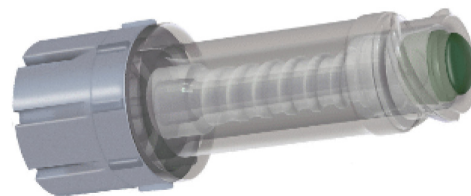
Biomaster is a trademark of Addmaster (UK) Ltd, a supplier of additives for plastics, textile, paper, paints and the coatings industry. For their video of how silver destroys bacteria go to: [Biomaster](#).

FDA Approves New Silver Catheter Connector

The US Food and Drug Administration (FDA) has cleared for use [RyMed Technologies’](#) InVision-Plus CS intravenous connector. The company says the product is the only needleless IV connector to offer the combined antibacterial protection of chlorhexidine and silver ions.

The FDA clearance notes that the CS “has been shown to be effective for seven days” against eight different microorganisms, all of which are commonly associated with catheter-related bloodstream infections. “Separately, both chlorhexidine and silver have a long history of being safe and effective. CS is the first needleless connector to combine them in a device that also has the demonstrated advantage of zero fluid displacement,” said Dana Ryan, RyMed’s President and CEO.

Catheter-related bloodstream infections are one of the most frequent and deadly healthcare-acquired infections, killing 30,000 patients a year in the United States, according to the FDA.



RYMED TECHNOLOGIES

This catheter connector combines silver with an infection-fighting chemical for extra safety.

Diamond State Precious Metals Depository Opens

[Diamond State Depository, LLC](#), a private, precious metals depository, has begun operating in New Castle, Delaware, from where it stores, transfers and ships precious metals bullion and coins. It also provides complementary accounting services to individual and commercial customers globally, according to President and General Manager Mike Clark.

“We’re set up to meet the insured custody and delivery needs of high-volume commercial accounts and private individuals alike, with state-of-the-art security,” says Clark. “Our depository operates with a secure warehouse and a Class-3 vault -- the highest possible vault rating -- and our facilities are monitored by security experts twenty-four hours a day.”

In addition to gold and silver bullion and coins, the facility holds platinum, palladium and rhodium.

Throughout the Northeast US in particular, Clark notes, jewelry and certain other industrial manufacturers are heavy users of precious metals, but they generally do not have the means by which to safely hold a large volume of precious metals, as they lack the security, facilities and insurance to do so.

Diamond State holds precious metals and certified coins off of its balance sheet, in insured, custody accounts that are titled in account owners’ names, so that clients have full control over their assets. All commercial accounts are physically segregated, but individual investment customers can open a Standard Storage account, where their metals or coins are stored with those of other customers. For a higher fee, individual customers also can choose the Segregated Storage option. Diamond State provides its commercial accounts with daily transaction confirmations and either weekly or monthly inventory reports. For all commercial accounts, sub-accounting or participant accounting services are available.

Clark says that because of Delaware’s tax advantages, clients can save hundreds, if not thousands of dollars a year by storing precious metals and coins at Diamond State. Delaware offers many advantages to businesses and local taxpayers, including no state sales tax, no personal property tax, no inventory tax and no commercial net worth tax. Delaware does not tax payments on depository-storage fees. Retail coin and bullion purchases in any state in the US can be made free of sales tax if those assets are shipped by the seller for credit to the buyer’s custody account at Diamond State, Clark says.

Larry Kahaner
Editor

www.silverinstitute.org

Silver Prices 1979-2010

2010	High	Low	Average
Aug	19.40	17.90	18.46
July	18.35	17.42	17.90
June	19.18	17.29	18.48
May	19.64	17.49	18.41
Apr	18.42	17.67	18.11
Mar	17.50	16.45	17.09
Feb	16.74	14.82	15.90
Jan	18.78	16.18	17.71

2009	High	Low	Average
Dec	19.30	17.02	17.69
Nov	18.77	16.43	17.86
Oct	17.89	16.17	17.17
Sept	17.41	15.04	16.50
Aug	14.98	13.87	14.40
July	13.99	12.64	13.38
June	15.95	13.57	14.62
May	15.60	12.48	14.11
Apr	13.02	11.79	12.50
Mar	13.86	11.95	13.09
Feb	14.49	12.30	13.41
Jan	12.56	10.42	11.39

Year	High	Low	Average
2009	19.30	10.42	14.68
2008	20.69	8.79	14.97
2007	15.50	11.47	13.38
2006	14.85	8.82	11.62
2005	9.00	6.43	7.32
2004	8.21	5.51	6.67
2003	5.98	4.35	4.89
2002	5.11	4.22	4.60
2001	4.81	4.03	4.36
2000	5.55	4.56	4.97
1999	5.76	4.87	5.22
1998	7.26	4.62	5.51
1997	6.34	4.16	4.88
1996	5.82	4.68	5.18
1995	6.10	4.38	5.19
1994	5.78	4.57	5.28
1993	5.44	3.52	4.30
1992	4.32	3.63	3.94
1991	4.55	3.51	4.03
1990	5.35	3.94	4.82
1989	6.20	5.02	5.47
1988	8.06	6.01	6.53
1987	11.25	5.35	6.99
1986	6.32	4.85	5.49
1985	6.89	5.48	6.14
1984	10.17	6.25	8.15
1983	14.74	8.38	11.46
1982	11.30	4.81	7.93
1981	16.53	7.97	10.53
1980	50.35	10.20	20.66
1979	35.00	5.93	11.20

(COMEX settle)

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