SILVER NEWS

THE SILVER INSTITUTE

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Silver, the Athlete's Clothier

By Samuel Etris, Senior Technical Consultant to The Silver Institute

Warm polyester fiber clothing – which in the coldest weather wicks moisture away to keep the wearer dry – is sweeping the outdoor clothing industry. Polyester starts life as grain alcohol and, flowing over silver, is converted into ethylene oxide, the man-made fiber's building block.

AMBERCROMBIE & FITCH

This Mount Washington jacket from Abercrombie & Fitch relies on polyester for its warmth. Silver acts as a key chemical catalyst in producing polyester fibers.

Polyester plastic can be formed into fibers of any length or shape including those that are microscopically small. The polymer can be made into fibers as soft as wool, flexible as silk, comfortable as cotton, and hollow and water repellant as the natural hairs of beavers and otters.

"The whole polyester phenomenon has really taken hold in today's marketplace based on generating specific end-use characteristics," says Prof. Mark Sunderland, Assistant to the Dean of the Philadelphia University of Engineering and Textiles. "Think of the polyester fiber like pasta; it can be made into any desirable shape."

The polyester revolution is now being exploited by sports clothiers. Hikers and joggers find that its fabric draws away moisture yet breathes easily. High-altitude mountain climbers discover that the napped effect of its fleece keeps the wearer warm and protected from the wind. When wind hits the top layer of its entangled web micro-denier surface, it diffuses, going in multiple directions, keeping the wearer warm. The polyester fabric provides a comfort superior to any natural fabric and an expanded margin of safety in extreme cold.

World production of polyester for fabrics has soared since its introduction into sports wear. In 2002, its use in textiles amounted to about 20 million tons, growing in 2008 to 39 million tons. Polyester plastics are also used in bottles, films, packaging materials, and a wide variety of engineering applications besides textiles. The total consumption in 2008 is estimated to be 50 million tons.

Silver is a key catalyst to producing polyester as the unique characteristics of silver convert ordinary grain alcohol into ethylene oxide on contact. This simple oxide reacts with water and a phthalic acid to produce the polyester polymer which is tough, flexible, and permanent, providing high strength with low water absorption. Worldwide production of polyester plastics continues to escalate, demanding silver crystals to oxidize the grain alcohol, which, according to surveys conducted for The Silver Institute's *World Silver Survey*, requires the continuing industrial use of about 1,200 metric tons of silver.

There is an additional important contribution that silver makes to athletic wear. Silver-coated polyester fabrics incorporate the natural biocidal action of silver, which prevents odor buildup caused by bacteria.

Silver-Based Research Wins First Place in Siemens Competition

Project Offers New Way to Measure Silver's Anti-Bacterial Release Rates

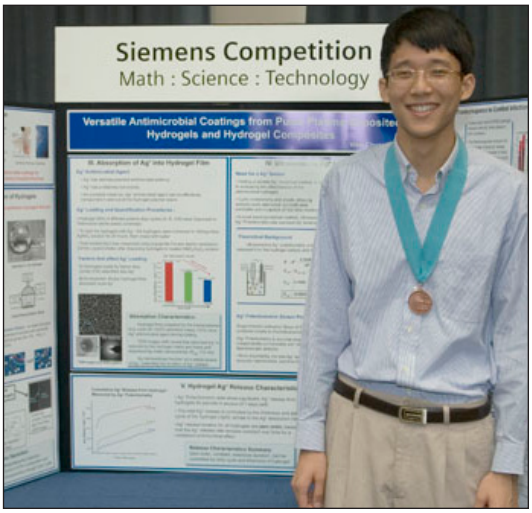
Seventeen-year-old Denton, Texas, high school student Wen Chyan has won first place in the 2008 Siemens Competition in Math, Science & Technology for his bioengineering research of silver-based, antimicrobial coatings for medical devices. Chyan's goal was to design a specialized coating aimed at preventing common hospital-inflicted infections, which affect more than two million patients each year and kill more than 100,000 of those patients, according to US government studies. "I have relatives who have dealt with hospital infections, so I knew this project would have very direct, real-world applications," he said.

Chyan's design makes use of hydrogel composites that release silver ions to fight infections. Perhaps more importantly, Chyan has also developed an analytical procedure that offers real-time data on silver release rates, even at silver concentrations as low as 50 parts per billion. Using this procedure, Chyan was able to show that the silver release rates increased at elevated temperatures, such as might accompany an infection. This means that more of the antimicrobial agent would be released when it is most needed.

Titled "Versatile Antimicrobial Coatings from Pulse Plasma Deposited Hydrogels and Hydrogel Composites," Chyan's entry netted him a $100,000 college scholarship. A patent application based on his work also is underway.

"This research was not only a creative idea, but required a proactive approach where cross-disciplinary initiatives had to be taken. The fields of electrochemistry, material science and biology all had to be explored in depth by Mr. Chyan," said W. Mark Saltzman, Goizueta Foundation Professor of Chemical and Biomedical Engineering at Yale University, a competition judge. "With further testing, these findings have the potential to improve a wide range of medical devices from intravascular devices at hospitals or catheters used in insulin pumps."

A senior at the Texas Academy of Mathematics and Science, Chyan hopes to attend MIT or Harvard. He also composes music and plays piano and violin in his spare time.



SIEMENS

High school student Wen Chyan won first place in the Siemens Competition for his work in silver-based medical devices.

The Siemens Competition was launched in 1998 to recognize America's best and brightest math and science students. In 2008, 1,893 students registered to enter the Siemens Competition with a total of 1,205 projects submitted – an increase of more than 10 percent in team and individual project submissions and an increase of more than 16 percent in the number of registrations. Entries are judged at the regional level by scientists at six leading research universities which host the regional competitions. For further information: http://www.siemens-foundation.org/en/competition.htm

New Semiconductor Material Changes Properties With Temperature Shifts

Silver is Key to New Integrated Circuit Applications

A group of German researchers has discovered that a compound containing silver, tellurium, and bromine alters its semiconductor properties – going from one type of semiconductor to another – in response to changes in temperature. This may radically change how integrated circuit chips are designed and used in the near future.

"This new material may be able to help simplify chip production," researcher Tom Nilges of the University of Muenster, in Germany, told www.PhysOrg.com. "Instead of using two materials to build transistors for integrated circuits, there is now a reasonable chance that this job could be performed by a single material." Nilges's research was highlighted in the February issue of the journal *Nature Materials*.

Researchers have understood for some time that silver-based semiconductor compounds can carry electrons and silver ions exceptionally well, making them useful in a variety of electronics applications such as memory devices. Another application is in the inexpensive production of electricity without causing air pollution.

The ability of material to switch from one type of semiconductor to another (known as 'p-type' to 'n-type' and back again) is the result of several structural changes caused by temperature differences. Silver plays an important role in this morphing phenomenon as its electrical properties help the tellurium ions to form different structural 'chains' and, thus, a different type of semiconductor.

Nilges's group will be studying how to fine-tune the material's physical properties beyond the changes caused by temperature.

Bullion Art: Beyond Artistic Value

Most artistic sculptures are made from stone, wood, bronze or other low value materials. Although the art has market value – because of the artist's skill and the beauty of the work - the sculpture's material itself has little intrinsic value. This is changing, however, with the growing interest in bullion art which is produced from both gold and silver, but is most often cast from .999 silver.

Proponents of bullion art suggest that compared to gold, silver may be the better medium for bullion art, noting that silver's growing industrial uses are making it scarcer and more valuable. "Silver could be the first raw material in the world which could get scarce, long before uranium, lead or oil," Bullion Art officials suggest.

Bullion art goes beyond Western art and includes Shona Sculpture, centered in present-day Zimbabwe, which may have links to traditions dating back more than 2,000 years. Often done in stone, these sculptures are also produced in silver and gold, and represent one of the most important art forms to emerge from Africa in this century.

For more information go to www.bullion-art.com

BULLIONART

This .999 silver sculpture, titled *Lips*, is an example of Shona Sculpture and indicative of Bullion Art

Germ-Fighting Labels Debut In UK

UK-based Royston Labels has developed silver-imbedded antimicrobial labels to combat the growth and spread of bacteria, fungi and mold. The labels come in both clear and white and are aimed at hospitals and other medical facilities which could benefit from killing germs on surfaces of files, as well as containers and medical equipment that require labeling, especially those in which labels are changed with each patient.

In its own tests, Royston officials say that the effectiveness of the antimicrobial properties did not diminish with time and lasted for the life of the label. Paul Clayton, managing director, said: "Following well-publicized health scares resulting from the spread of deadly bacteria, there is now a much greater awareness of the importance of good hygiene. The development of products which are effective in preventing the growth and spread of these high risk bacteria can only help improve hygiene, particularly in those areas which are more at risk from the spread of infection such as hospitals."

Spinal Implant Imbedded With Silver Can Prevent Infections

Newly-established medical device company DiFUSION Technologies, Inc., (www.difusiontech.com) has successfully completed a series of laboratory tests of its silver ion-based antimicrobial technology designed to mitigate Surgical Site Infections (SSIs) in spinal surgery, according to company officials. The Austin, Texas-based company will incorporate the technology into its first spinal implant, called CleanFUZE.

DIFUSION

This spinal 'cage' implant imbedded with silver helps prevent infections during surgery.

The tests showed that the silver-imbedded implant was 99.999 percent effective against bacteria growth. This is significant, officials say, because major medical studies indicate that Spinal Site Infections occur in 2.5 to 13 percent of patients who receive spinal implants.

The infection-fighting material used in CleanFUZE is a 'super silicate' molecule composed of antimicrobial silver ions that is compounded into a plastic spinal interbody cage. Once the cage is implanted into the spinal disc space during surgery, silver ions exchange with naturally occurring sodium ions in the bloodstream and diffuse antimicrobial silver ions for a period of four weeks. Unlike other devices on the market, CleanFUZE will be capable of releasing its dosage amount over time and the rate of diffusion can be controlled by parts-per-billion, company officials say.

"Larger companies have spent years and millions of dollars trying to address the SSI problem with antimicrobial coatings which do not fight infection past the first 48 hours. Our technology provides antimicrobial protection for four weeks due to 'controlled cationic release,'" said Dr. Hyun Bae, a member of DiFUSION's scientific advisory board and a board-certified orthopedic surgeon in Santa Monica, California.

CleanFUZE will not only improve infection ratios, it will also save the patient from additional surgery, weeks of IV antibiotics and in some cases lifelong exposure to oral suppressive antibiotics, amputation and even death. "DiFUSION is targeting a problem that costs hospitals and insurance carriers over $100,000 per SSI incidence, and CleanFUZE has the potential to not only obviate spinal surgical site infections, but also save hospitals millions of dollars a year in associated costs to treat these infections," said Dr. Peter Whang, a member of DiFUSION's scientific advisory board and an Assistant Professor in the Department of Orthopaedics and Rehabilitation at the Yale University School of Medicine in New Haven, Connecticut.

Added Dr. Matthew Geck, orthopedic surgeon, founder and board member of DiFUSION: "Our solution addresses the U.S. Department of Health and Human Services's (HHS) action plan released in January 2009 to reduce and eliminate healthcare-associated infections (HAIs), one of the key areas being surgical site infections. HAIS are among the top ten leading causes of death in the United States, accounting for an estimated 1.7 million infections and 99,000 associated deaths in 2002."

American Eagle Silver Bullion Coins Selling Briskly

On Track to Meet or Exceed Last Year's Record Sales

American Eagle Silver Bullion Coins have enjoyed healthy sales during the first two months of 2009 with more than 3 million of the one-ounce coins sold. This puts the coins on track to meet or exceed last year's record sales of 19.6 million ounces.

Silver and other bullion coins have grown in demand partly due to the global economic downturn. During similar unsettled conditions in the past, consumers often turned to gold and silver as storehouses of wealth and safety instead of investing in equities or bonds.

US MINT

Since their introduction in 1986, American Eagles have become a leading silver bullion coin investment product with more than 180 million one-ounce coins sold.

Since their launch in 1986, American Eagles have become a leading silver bullion coin investment product with more than 180 million one-ounce coins sold. Unlike commemorative or numismatic coins -- which are valued by their limited mintage, rarity, condition and age -- bullion coins are purchased by investors seeking a simple and tangible means to own and invest in the gold, silver, and platinum markets. The American Eagle Silver Bullion Coin is only available in the one-ounce size, while the American Eagle Gold and Platinum Bullion Coins are available in four denominations: one ounce, one-half ounce, one-quarter ounce, and one-tenth ounce. Aside from the proof version, the US Mint does not sell American Eagle Bullion coins directly to the public. Instead, the Mint distributes uncirculated Bullion coins through a network of 'authorized purchasers' including wholesalers, brokerage companies, precious metal firms, coin dealers, and participating banks.

For information go to: www.usmint.gov

For Future Reference
Silver Prices 1980-2009

2009	High	Low	Average
Jan	12.56	10.42	11.39
2008	**High**	**Low**	**Average**
Dec	11.39	9.35	10.32
Nov	10.46	8.80	9.78
Oct	12.72	8.79	10.39
Sep	13.46	10.46	12.22
Aug	17.48	12.80	14.48
July	19.18	17.25	18.07
June	17.62	16.46	17.01
May	18.24	16.12	17.01
Apr	18.31	16.50	17.48
Mar	20.69	16.81	19.16
Feb	19.81	16.30	17.66
Jan	16.95	15.17	16.05
2007	**High**	**Low**	**Average**
Dec	14.8	13.83	14.37
Nov	15.5	13.96	14.66
Oct	14.38	13.25	13.57
Sep	13.79	12.19	12.91
Aug	13.12	11.47	12.28
July	13.36	12.47	12.93
June	13.76	12.21	13.09
May	13.53	12.81	13.15
Apr	14.06	13.29	13.74
Mar	13.53	12.64	13.11
Feb	14.69	13.33	13.95
Jan	13.51	12.13	12.83
Year	**High**	**Low**	**Average**
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

(COMEX settle)

The Silver Institute
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888 16th Street, NW, Suite 303, Washington, DC 20006
Telephone (202) 835-0185; Fax (202) 835-0155
www.silverinstitute.org
Editor, Larry Kahaner