

Silver News

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Silver's Use in Photography Continues

Don Franz, Editor, *Photo Imaging News*



MIXBOOK PHOTO CO.

The market for premium photobooks made on traditional silver-halide paper continues to grow.

For more than a century, silver-halide photography was the predominant technology used for recording images with cameras, even after Polaroid instant pictures became appealing to consumers. However, the proliferation of digital cameras, not to mention cell phones with cameras, in the late 1990s, reduced the need to process film, signaling the beginning of a slow decline of silver use in photography. Nevertheless, according to the [World Silver Survey 2022](#) published by the Silver Institute, last year witnessed an increase in silver's use in photography of 3 percent over 2021, and more people today are taking pictures on film.

Although the cost for processing film is increasing -- materials, labor, etc. -- this does not seem to deter many photographers, according to our surveys. Additional labs are starting and restarting film processing lines despite the challenge of finding equipment. Also, hobbyists continue to process and print films in home darkrooms, as they have for decades.

And, somewhat surprisingly, young consumers are increasingly taking instant pictures, quickly producing prints. This has spurred a revived interest among hobbyists and professionals to shoot silver-based film. Although photo film manufacturers face similar issues to papermakers, and major brands have discontinued some types, new crowdfunded companies are making small-scale runs of regular color and black-and-white films as well as specialized films for creative applications that use silver-halide.

Photobooks that use silver-based photography tell complete stories, while individual prints cannot, and people are increasingly shifting from making individual prints to storytelling. Especially in Europe, the market for premium photobooks made on traditional silver-halide paper continues to grow.

Some motion picture feature movies are still being shot on traditional silver-based film and hobbyist videographers are returning to traditional silver-halide film as some crowdfunded companies are making small-scale runs of movie-making film in different formats.

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Traditional x-ray film, a major user of silver, is still used in many industries and in the medical field, mainly because the image cannot be altered. Last year also saw a rebound in x-ray use, which was a big factor in the increase in the overall consumption of photographic silver.

What about the future? Many casual observers have the impression that silver-based photography is disappearing but that is simply not true. Travel and picture-taking opportunities have returned along with growing demand for single-use cameras. New photographic films are being introduced, and the impact of the x-ray backlog continues.

Don Franz is the editor of [Photo Imaging News](#), a newsletter that covers the international photo imaging industry with reviews of conferences, companies, products and applications.

The Passing of Bradford Cooke, Silver Institute President

Members of the Silver Institute offer condolences to the family, friends, and colleagues of Bradford Cooke, founder and Chairman of Endeavour Silver and President of the Silver Institute, who passed away unexpectedly in August.

Michael DiRienzo, Executive Director of the Silver Institute, said, “We were extremely saddened to learn of Brad’s passing. He was an accomplished geologist and mining executive whose leadership and commitment to the Institute was steadfast. Our members relied on Brad for his experience and keen insight, especially his passionate dedication to sustainability and environmental, social, and governance issues. We will miss him greatly.”

For more information, see “[A Tribute: In Loving Memory of Bradford Cooke](#),” which contains a photo gallery and quotes from the leadership team and close friends at Endeavour Silver.



Bradford Cooke

A New Way to Coat Body Implants with Silver

Coating body implants, especially those made of polymers such as those used for hernia or gynecological repair, with silver nanoparticles has become almost commonplace but one challenge has been to keep the particles on the implant and to prevent them from leaching out into the patient.

A new approach is under study by researchers at the [University of Alabama at Birmingham](#), who say they have developed a method to coat polymers that keeps the nanoparticles intact. Polymers can be natural or synthetic and often make up materials in living organisms or man-made materials. Examples of natural polymers are wool, DNA, silk, cellulose and proteins. Artificial polymers are mostly made from petroleum and include items like nylon, polyethylene, polyester, Teflon, and epoxy. Many implants are artificial polymers.

Getting the silver to stick to polymers, though, can be difficult. Associate Professor Vinoy Thomas, who heads the research team, noted in a prepared statement: “The challenge of attaching metallic nanoparticles is especially difficult in cases involving hydrophobic (water rejecting) polymeric biomaterials, which most polymeric biomaterials fall under.”

The team developed a process they call plasma electroless reduction or PER. The PER process deposits silver and gold nanostructures on polymer material surfaces, including cellulose paper, polypropylene-based facemasks and 3-D printed polymer scaffolds used for implants.

Speaking about facemasks and other surfaces, Thomas added: “[Plasma] has enormous capability in materials processing and to decontaminate surfaces for preventing the spread of COVID-19 and other communicable diseases.”

Dingo Bullion Coin

The Perth Mint in Australia has released its latest silver bullion coin and it features the country’s wild dog, the dingo.

The .9999 silver coins come in two-dollar (62.2-gram, 75,000 mintage) and 10-dollar (311-gram, 2,500 mintage) denominations.

The coins are part of the Next Generation series that has featured the platypus, kookaburra, crocodile and the koala. The series is now in its fifth year of production.

The reverse side of the coin depicts a dingo sitting with its pup. The obverse side shows a likeness of HM Queen Elizabeth II, the denomination, and the year of issue, 2022.

Both denominations are minted as Piedfort strikes (double thickness).

According to the Perth Mint, the coins are only available for sale within Australia. For more information [click here](#).



Silver Helps Test for COVID-19

Chinese Scientists Develop Cheap, Fast Test for Many Variants

Scientists at [Sichuan University in Chengdu](#) and [Tsinghua University in Beijing](#) have invented an inexpensive and quick test for COVID-19 and its variants that changes the color of special paper when the disease is detected.

The test relies on the ability of viral cells to release an enzyme in the presence of silver ions that breaks the sample down into ammonia, carbon dioxide, and water. Ammonia, which is a base (as opposed to an acid) can then be detected by paper akin to litmus paper, which changes colors when dosed with either acid or base liquids.

“To demonstrate the simplicity, portability, and multiplexing capability of MARVE (the acronym for the test) we measured SARS-CoV-2 and its five key variants in an integrated testing paper using a smartphone. We also developed a smartphone application to guide the diagnosis, and to visualize and record the test results for clinical and cold-chain food samples, facilitating on-site profiling of SARS-CoV-2 variants by minimally trained personnel,” the authors noted in their [journal article](#). “MARVE has potential as a streamlined technology for the diagnosis and screening of SARS-CoV-2 variants without the need for complex laboratory settings.”

The researchers say that each assay could cost about US\$0.30 per test and be read within 30 minutes. The test is still under development, and it's unclear when or if it will be approved and put into production.

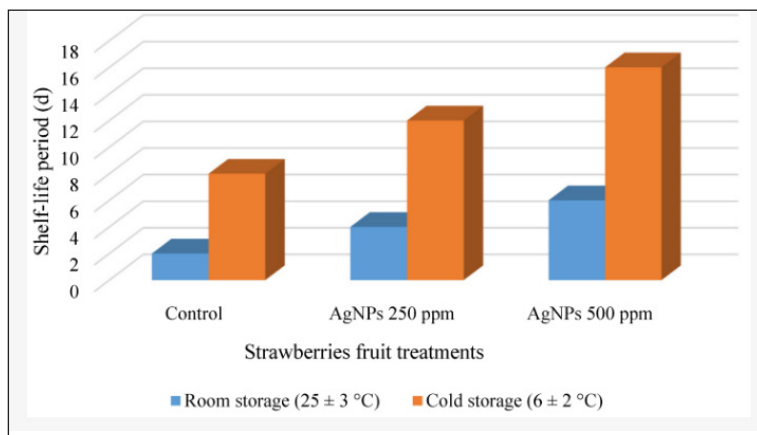
Silver Helps Pomegranates Grow Stronger and Strawberries Last Longer

Drought conditions in many areas are placing additional strains on crops by lowering their resistance to diseases, insects, fungi and other microbes, but silver is helping to bolster the immune systems of these plants.

For example, a team of researchers from the Middle East and China cited previous studies showing that silver nanoparticles “influence plants by different levels, such as germination promotion, growth activation, increasing the accumulation of biomass, improving shoot growth, and raising the pigment content,” according to their [study](#), published in a peer-reviewed journal. Their own work revealed that spraying pomegranate trees with a mixture of silver nanoparticles, potassium silicate, and selenium “ameliorated the shoot length, diameter, leaf chlorophyll content, set of fruiting percentage, and fruit yield per tree and hectare compared to control through studying seasons. Moreover, they improved the fruit weight, length, and diameter, as well as total soluble solids, total, reduced, and non-reduced sugars percent, while they lessened the juice acidity percentage compared to control,” the researchers wrote.

In a related study by scientists from [Al-Azhar University in Egypt](#) and [Taif University in Saudi Arabia](#), spraying a mixture of starch and nanosilver on strawberries extended the fruit's shelf life from 2 to 6 days at room storage and from 8 to 16 days in cold storage. They also noted in their [journal article](#) that: “The coated samples had the lowest weight loss, decay, and microbial counts as compared to the uncoated sample.” This finding is especially important for strawberries because once picked they get soft and mushy quickly and decompose rapidly, especially in warm conditions. The researchers noted: “... from both a technological and economic standpoint, slowing the rate of degradation is a major problem.” Decomposition not only yields lower profits for growers and shippers but also results in lower nutrients in the fruit.

They concluded: “Finally, to make use of nanotechnology's unique qualities, we advocate encouraging its use in food processing, particularly in food packaging trends.”



Strawberries sprayed with a mixture of silver nanoparticles and starch had a longer shelf life than untreated fruit.

New Technology to Recycle Silver from Solar Cells Shows Promise

The US Department of Energy (DOE) has awarded a [University of Virginia](#) engineering professor a US\$250,000 grant to study better ways to extract silver from old solar panels and put them back into new solar panels or other industrial applications.

“Silver is the world’s most efficient and cost-effective electrical and thermal conductor,” said Mool Gupta, the project’s principal investigator, in a prepared statement. “An average solar panel of two square meters in size uses about 20 grams of silver, so the photovoltaic (PV) industry consumes about 8% of the world’s silver supply annually. Yet the relative expense and demand for silver, especially in the growing solar panel market, makes it an important material to reclaim and not waste.”

Mool’s project is part of a larger \$6 million DOE Solar Energy Technologies Office effort to help small, innovative projects in photovoltaics and solar-thermal technologies.

Silver plays several roles in the production of solar panels. The most important is in the form of silver paste which is screen printed to make the silver lines that you can see on the photovoltaic cells.

To remove the silver from spent panels, Gupta’s process uses a new method called ‘laser ablation’ on the cells that converts the silver lines into silver nanoparticles. The particles do not need further refinement, Gupta says, before they can be used in new photovoltaic cells or other uses including biomedical devices, which often employ silver nanoparticles.

Gupta’s technology is greener than current processes that extract silver using nitric acid, a method that is inefficient and not environmentally friendly.

If Gupta’s process is successful in large-scale recycling operations, it would come at an opportune time. Solar panels last about 20 to 25 years, and those installed at the beginning of the 21st century in large numbers are coming to their end-of-life.

The components in a solar panel with the highest value are aluminum, silver, copper and polysilicon. Silver accounts for about 0.05% of the total weight but makes up 14% of the material value, according to estimates by consultancy [Rystad Energy](#). The company estimates that all recyclable materials from PV panels at the end of their lifespan will be worth more than US\$2.7 billion in 2030, up from \$170 million this year, and the value will approach \$80 billion by 2050.



POLYMERS

Silver makes up 14 percent of the material value of solar panels.

Larry Kahaner
Editor

www.silverinstitute.org
[@SilverInstitute](#) on Twitter

THE
SILVERINSTITUTE

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