

# Silver News

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## Q&A with Chirag Thakkar

Chirag Thakkar is CEO of [Amrapali Gujarat](#) in India. Amrapali Gujarat is a new member of the Silver Institute. We spoke with him about the company and the Indian silver market. Following is an edited interview.



*“Ethical business practices towards every aspect of business is in our core.” --  
Chirag Thakkar*

Silver News: How did you get involved in the Amrapali Gujarat (Ahmedabad). What is your employment and education background?

Chirag Thakkar: I hold a Bachelor’s of Commerce from Gujarat University. I also have cleared one of the most competitive exams of the Indian Administrative Services (IAS) in 2006 conducted by the Union Public Service Commission. After clearing the exams, I joined the family business in 2007 and now hold the position of CEO.

Amrapali Gujarat is a family-owned business group based in Ahmedabad, India since 1983. It is owned by my father, Yashwanth A. Thakkar.

SN: What is the current state of the Indian silver market? Where do you see it going in the near and long-term future; for example, demand, consumption, new products, trading, etc.

Chirag Thakkar: The Indian silver market has seen massive expansion over the last 5-6 years. Demand for silver has increased from around 3,000 to 6,000 tons. This is largely due to lower silver prices and increased demand from rural India. Indian silver demand can be distinctly categorized into industrial and non-industrial usage. The industrial demand contributes around 20% of demand whereas non-industrial demand, which includes jewelry, silverware and investment, contributes around 80% of demand. Within the non-industrial segment, the largest contributor is jewelry which has 40% market share and 30% each from silverware and investment.

SN: Indian consumers have a long relationship with silver, especially its involvement with celebrations like weddings. How does this affinity affect the silver market in India?

Chirag Thakkar: Silver, like gold, has an important place in Indian tradition. It is considered auspicious to buy silver or to gift silver during important events like the birth of a child, weddings or during festivals. Indians prefer to buy jewelry, utensils and also artifacts of gods and goddesses in silver.

SN: What silver products are Indians most interested in and why?

Chirag Thakkar: One of the most popular items purchased by Indians is payals (ankle chains). Nearly 50-60% of silver jewelry purchased is in the form of payals. The other popular items are silver utensils and articles of gods and goddesses. Every Indian household, depending on income, would have silver utensils. Another very popular item is silver coins with inscription of gods and goddesses which is purchased during festivals. According to Indian tradition, ankle chains worn by ladies on their legs bring wealth and fortune to the

family. Silver utensils bring health and long life when utilized in day-to-day routines.

SN: Explain the offerings of Amrapali Spot. Are there any products or services that set you apart from similar companies?

Chirag Thakkar: Amrapali Spot is an online physical trading platform where a registered client can buy and sell silver from 1kg to 30 kg and 1 gram to 1,000 grams of gold online.

Physically-settled contracts on the spot market are our ultimate selling point (USP). Being centrally located, we have PAN (presence across nation) India where the physical stock is delivered to the doorstep of our client.

We have more than 900 registered clients; we have been handling 25% (48.2 mil. Oz.) of the physical metal imported in India. We have been successful in converting around 70% of trades to terminals, although around 30% of our clients prefer to call the desk for trading the physical stock.

SN: It's unusual in many countries for a large company like Amrapali Group to have such diverse subsidiaries. How does Amrapali Spot add to the group's synergy?

Chirag Thakkar: We have been very fortunate to have such large subsidiaries diversified into fields such as: finance, entertainment, equity and derivative brokering, real estate (land and development projects in Ahmedabad), mining, hospitality, and a bullion house and refinery.

Amrapali Spot has played a vital role in the growth of our business group across all diversification lines.

We started trading in physical bullion in 1997-98. Since then, we have been aggressive in the local domestic market. In 2008, we started expanding to other parts of India. By 2014, we almost covered the major network of bullion distribution PAN India.

From 2013 to 2019, Amrapali has been awarded the *Best Silver Bullion Dealer of the Year* award every year by various organizations, conventions and conferences including the Indian International Bullion Summit, Gems and Jewelry Trade Council of India, and the Indian International Gold Convention.

SN: Your annual report discusses sustainability and corporate responsibility. Can you explain what that means for your company?

Chirag Thakkar: Being strongly compliant about all the diversified business and its branches, we are also very focused on responsible sourcing and work only with top tier banks for our source of supply.

Ethical business practices towards every aspect of business is in our core.

Amrapali Charitable Trust owns and serves an old-age home, without any financial support from outside the family, where old people are given basic necessities of life free of cost including shelter.

Diversification is our key to sustainability.

SN: Is there anything else you would like to add about you or your company?

Chirag Thakkar: We have added a feather to our wings and partnered/collaborated with GGC ([www.gujaratgoldcentre.com](http://www.gujaratgoldcentre.com)) which refines gold and silver. They have hallmarking facilities and are a NABL (National Accreditation Board for Testing and Calibration Laboratories) accredited laboratory. They are recognized under the Gold Monetization scheme by the Indian government, hold an ISO2017 certificate, import gold and silver dore and have a license from the Bureau of Indian Standards (BIS).

## Silver Could Help Patients Take Multiple Drugs at the Right Times

Patients who need to take different medications at different times often make errors in timing or even forget to take some doses. Now, a research team working at the Technical University of Munich (TUM), have figured out a way, using silver nanoparticles, that three different drugs can be administered at the same time -- but the individual medicines are released at pre-defined intervals.

Oliver Lieleg, a professor of biomechanics and a member of the Munich School of Bioengineering at TUM, explained that a multi-medicine ointment applied to a surgical incision could first release a pain reliever, then deliver a drug to reduce inflammation and last, distribute a drug that reduces swelling. "Ointments or creams releasing their active ingredients with a time delay are not new in themselves," he said in a prepared statement. "With the drugs currently in use, however, there is no guarantee that two or more active ingredients will *not* be released into the organism simultaneously."

Lieleg and his team imbedded nanosized particles of silver, iron oxide and gold into hydrogels (polymers that swell up and hold a great deal of water) then watched with special instruments as the particles left the gel at different times. They controlled the exit times by varying the amount of artificial DNA in the gel.

In the experiments, the silver particles were bound by pieces of artificial DNA, which could not move around in the gel. When saline solution was added to the silver, particles separated from the DNA and moved onto the skin surface. The saline mimicked the body's natural perspiration. The iron oxide bound within the gel did not get released until the silver nanoparticles were dissolved. The gold particles followed.

The particles were 'stand-ins' for drugs and showed how artificial DNA could determine their exit times from the hydrogels. "Because the saline solution has approximately the same salinity as the human body, we were able to simulate conditions where the active ingredients would not be released until the medication is applied," explained doctoral candidate and team member Ceren Kimna.

Added Lieleg: "The consistency of ointments makes them the most obvious solution for a hydrogel-based approach. However, this principle also has the potential to be used in tablets that could release several effective ingredients in the body in a specific order."



Professor Oliver Lieleg and his team are using silver to help patients take their medicine on time.

# Promising Research Yields New Clues to How Silver Tarnishes

## Findings Could Improve Silver's Reliability in Electronic Components

Scientists have known for a long time that the cause of silver tarnish is the hydrogen sulfide which is present in minute amounts in everyday air. Even amounts as small as parts per billion can tarnish silver items over time. One question that has not been answered is why does silver tarnish more in the presence of hydrogen sulfide in the air we breathe than in oxygen, which makes up about 21% of the air around us. The question is vexing because the mechanism appears to be similar -- at least on the macro level.

On the atomic level, however, the answer becomes clear.

Nokia Labs in collaboration with researchers at Trinity College, Dublin, used a technique known as Reactive Force Fields or ReaxFF that teaches a computer how to produce atomic-level chemical results that simulate how silver reacts with oxygen versus how it reacts with sulfur.

The results showed that silver sulfide forms faster than silver oxide (both are the dark tarnish that we can see with the naked eye) because the sulfur molecules break up into individual atoms when they touch silver thus producing more chemical reactions. Oxygen atoms adhere tighter to each other leaving few atoms available to react with the silver surface.

In addition, you might expect that once the first layer of tarnish was produced, it might slow down further tarnish activity as the coating would keep additional atoms from reaching and reacting with the silver. This turns out to be the case with oxygen but silver sulfide (again, the tarnish material) tends to diffuse upwards towards the attacking sulfur which allows the tarnish to grow even faster. These discoveries could lead to possible 'doping' of silver items, which would slow down the tarnish process caused by the upward diffusion of silver sulfide.

"Observing a mechanism in which metal (silver) ions are 'sucked up' by sulfur and pushed towards the surface was utterly surprising," said Gabriele Saleh, postdoctoral fellow at Trinity College, in *Chemistry World*, a publication of the Royal Society of Chemistry (UK). "Silver could now be doped by elements that slow down its diffusion, thereby hampering its ability to move through the sulfide and greatly slow down the corrosion process."

He added: "Nokia Bell Labs are interested in producing printed circuit board finishes that can function for many years in corrosive environments. Now the time is ripe for carrying out materials design strategy towards corrosion-resistant, silver-based materials."

The research report published in *Angewandte Chemie*, a journal of the German Chemical Society, is available [here](#).



Technicians can use chemical sprays to remove silver tarnish on critical electronic components.

# Silver Keeps Bacteria from Forming on Dental Implants

Titanium implants are the standard of care for dental work. However, despite the best practices, the risk of infection and inflammation always exists. Worse, the bacteria can enter the bloodstream and cause serious complications, even death.

To help prevent bacteria from entering the body through implants, a group of scientists at the Faculty of Dentistry, University of Debrecen, Hungary, have tested the efficacy of coating the implants with silver nanoparticles.

The results were impressive.

In laboratory experiments, after depositing silver nanoparticles on the titanium before implantation, the *Staphylococcus aureus* bacteria was cultured on the implants and allowed to reproduce for 8 hours. The same bacteria were cultured on glass and on pure titanium samples.

The nanoparticles adhered to the implants and showed an antibacterial effect of 64.6% that was statistically significant. The team expects to continue experimenting with increasing the antibacterial effect of the silver by changing the surface configuration of the particles, thus allowing more contact with bacteria.

"Tests also proved that the nanoparticles are safely anchored to the titanium surface and are not cytotoxic," the authors wrote in the *International Journal of Nanomedicine*.

They concluded: "Creating a silver nanoparticle layer can be an option to add antibacterial features to the implant surface and to help in the prevention of peri-implant inflammatory processes. Recent studies demonstrated that silver nanoparticles can induce pathology in mammal cells, thus safe fixation of the particles is essential to prevent them from getting into the circulation."

# Patented Process Turns Mine Waste into Fertilizer

As the world's population grows and farmland becomes depleted of nutrients, synthetic chemical fertilizers are not a permanent solution to increase yield as they are used up by crops and must be replenished on a regular basis.

One long-term solution is remineralization of soil, specifically with a substance known as 'rock powder' (also known as stonemeal or stonedust) which, when mixed with soil, supplies nutrients to crop roots. However, rock powder is in short supply and found in limited areas such as fine dust from gravel quarries and rocks crushed by glaciers.

A new source of rock powder has emerged, however, from an unlikely source: mine waste.

Advanced Materials Processing, Inc. (AMPI) of Plymouth, California, has received a patent for cleaning mine waste and using the resulting earth as a source for natural fertilizer. The non-toxic process can remove metals such as silver, gold, lead and cadmium from mine waste, along with chemicals such as mercury and arsenic, and leaves behind earth that is rich in minerals beneficial to growing crops, according to Leonard Nanis, former University of Pennsylvania professor of chemical engineering and lead inventor.

The patent also covers mixing the rock powder with biowaste to create an environmentally-friendly fertilizer. "The fertilizer will remineralize and restore plant-essential nutrients that have been depleted by conventional chemical fertilizers," he said, in a prepared statement.

"With our patented process that removes heavy metals without using toxic chemicals, we have access to mine waste -- almost an unlimited supply," said Dennis Amoroso, AMPI president. "We can extract the leftover gold, silver, mercury and arsenic, and convert the deep-core earth into a natural fertilizer that will revitalize farm topsoil."

The company has begun work with abandoned gold and silver mines in California. Once the mine waste is clean and removed for fertilizer, the remaining areas are safe for recreational or residential activities, company officials say. [Plant Nutrition Technologies](#), AMPI's affiliate, mixes the mine waste with biomass to create a natural fertilizer called PoweRoc.

PoweRoc is produced in Plymouth, California, using the waste from the Empire mine, one of the state's historic Gold Rush mining operations. It is then used on almond and walnut orchards, replacing chemical fertilizers.

Read the patent [here](#).



A new process can turn mine waste into fertilizer for growing crops.

# CSI Meets Ag

One of the mainstays of popular television shows like *CSI: Crime Scene Investigation*, aired worldwide, is how forensic investigators are able to detect blood at crime scenes. Too often in real life, however, the samples are too small to be detected – until now.

Israel's Ben-Gurion University (BGU) of the Negev's technology transfer company, BGN Technologies, has produced a chip device that uses nanosilver particles to amplify the amount of light reflecting off of luminol (the long-used chemical that 'lights up' in the presence of blood) and allows trace amounts of blood to be identified that do not show up with luminol alone.

The device was developed by Professor Alina Karabchevsky, Ph.D., of the Electro-Optics and Photonics Unit and the Ilse Katz Institute for Nanoscale Science & Technology at BGU. In a prepared statement, she noted: "Practical implementation of the discovered effect will include further superior chemiluminescence-based sensors for forensic science, research in biology and chemistry, and no-source opto-chemical lasers."

"Identifying trace quantities of blood can increase the efficiency and accuracy of a forensic investigation of a crime scene, but requires more sensitive detectors than those that are currently available," said Netta Cohen, CEO, BGN Technologies. "The method developed by BGU researchers will enable development of future detectors with improved sensitivity. We are currently looking for partners for further developing this promising patented invention."



Professor Alina Karabchevsky uses nanosilver particles in a chip that allows the detection of trace amounts of blood at crime scenes.

BGU

# US Mint and RC Mint Issue Two-Coin Set

The US Mint and the Royal Canadian Mint have issued their first-ever limited edition two-coin set, the [2019 \*Pride of Two Nations\*](#).

The set includes a United States Mint American Eagle One-Ounce Silver Coin with an enhanced reverse proof finish and a Royal Canadian Mint One-Ounce Silver Maple Leaf Coin with a modified proof finish. Both finishes are firsts for these coins, according to mint officials. Both mints are selling the coin set.

The set retails for US \$139.95 from the US Mint, and \$189.95 CAD from the RC Mint.



US MINT

The *Pride of Two Nations* Coin set is a collaboration between the US Mint and the Royal Canadian Mint.

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