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Earth Day 2015: Platinum comes full circle

Heraeus's precious metals cycle is a prime example of sustainable resource utilization, in keeping with this year's Earth Day motto: "Cradle to Cradle."

Earth Day 2015, on April 22, is focusing public attention on the theme "Cradle to Cradle." The idea is that all goods should become part of a technological or biological material cycle, theoretically producing no waste. The "Cradle to Cradle" concept means utilizing resources in the most sustainable manner possible. While this goal is still a long way off for many material flows in our society, Heraeus has long implemented a sustainable precious metals cycle for recycling valuable and scarce precious metals such as platinum. It should also be noted that it takes up to 100 times less energy to extract platinum through recycling, as compared with extracting the same amount through mining.

Precious metals are very rare, and thus also very valuable. Mines produce more than 20,000 tons of silver and only about 2,400 tons of gold annually. Platinum group metals are even rarer: Altogether, approximately 500 tons of these metals are extracted worldwide from primary sources and by recycling automotive catalysts. The amount of platinum obtained each year—around 240 tons—would easily fit in a garage. These small amounts are in stark contrast to the essential role played by precious metals in our everyday lives. Modern cars would not run without them, computers would not work, there would be no flat screen televisions, and major portions of the chemical industry would not exist. The glass and oil industries would also face considerable difficulties – and we would even have to live without a cold ale.

The recycling rate depends largely on the product

For years, mines have not produced enough precious metal to meet growing demand from the automotive, jewelry, glass and chemical industries. Accordingly, it is very important to recycle these metals from a wide variety of industrial applications. Heraeus has gained a strong market position in the recycling of platinum group metals (PGMs)—not only platinum, but also palladium, rhodium, ruthenium and iridium.

Studies by the International Platinum Association (IPA) show that some 25 to 30 percent of the global demand for PGMs is already being met through recycling. In its recycling, Heraeus concentrates primarily on the precious metals in industrial catalysts—such as platinum gauzes for the fertilizer industry and bulk-material catalysts for industrial chemical processes. The recovery rate for precious metals extracted by recycling these materials can far exceed 90 percent, depending on the material. Experts refer to this as a nearly closed material cycle, which is to say that almost everything that goes into a product in the first place finds its way back into the precious metals or material cycle. Only a small quantity of valuable resources is lost, in keeping with the principle of "Cradle to Cradle."

“This approach even saves energy over the long term. Mining for platinum-group metals is not only difficult, labor-intensive and time-consuming—a ton of rock contains only two to six grams of precious metal—but energy-intensive as well,” explains Dr. Steffen Voss, Global Head of Operation & Innovation at Heraeus Metal Management. By comparison, when the same amount of platinum is extracted through recycling, energy consumption is lower by a factor of 70 to 100, and carbon dioxide emissions are lower by as much as a factor of 200 to 300.

Since as far back as the 1980s, Heraeus has been continually expanding recycling as a key part of the precious metals cycle at the global level. Heraeus operates recycling facilities at its customers’ sites to eliminate the need for time-consuming transport and the payment of expensive tariffs. In total, nearly 600 highly skilled specialists are at work at facilities in the US, Europe, China, India, and South Africa. Whether it involves gold for the jewelry industry or ruthenium for the data storage industry, silver for solar cells, platinum for industrial catalysts or iridium for the semiconductor industry—a wide variety of applications require an equally wide range of recycling methods.

“We use a technically sophisticated recycling process to recover all the precious metal from residues and used products according to international standards. The refined precious metals are then used to manufacture new products for use in industrial applications,” says Steffen Voss. “Thanks to ongoing technology transfer, we have consistent standards, production processes and levels of purity at all of our locations around the world, in accordance with internationally established guidelines.”

Precious Metals Trading, using the example of platinum gauzes

Woven gauzes made of platinum-rhodium alloys, and with diameters of up to six meters, are used in the production of nitric acid for the fertilizer industry. These gauzes are produced by Heraeus, and after use they are recycled at the customer’s location. The gauzes are carefully separated into individual components, such as platinum and rhodium. The purified precious metals are then turned back into wires and used to make new gauzes.

Precious Metals Trading plays an important role in this cycle, providing comprehensive precious metals management for the customer. Clients who wish to purchase platinum-rhodium alloy catalyst gauzes from Heraeus for their plants can secure the price of the necessary precious metals in a price hedging deal with the Trading department early in a project, thereby creating a stable basis for calculations. Trading then ensures that metal of the necessary purity is available at the start of production. By closely integrating trading, recycling and production, Heraeus offers its customers an uninterrupted material cycle. Only a few companies in the world have mastered this complex cycle in its entirety, as Heraeus has.

Heraeus, the technology group headquartered in Hanau, Germany, was founded in 1851 and today is a globally leading, family-owned company. We create high value solutions for our customers, strengthening their competitiveness for the long term. We have oriented our activities around the chemical and metal, energy and environment, communications and electronics, health, and mobility markets, as well as industrial applications. In fiscal year 2013, Heraeus achieved product revenue of €3.6 billion and precious metals trading revenue of €13.5 billion. With some 12,500 employees in over 110 subsidiaries worldwide, Heraeus holds a leading position in its global markets.

For additional information, please contact:

Dr. Jörg Wetterau
Corporate Communications & Marketing Services
Head of Technology Communications & Trade Press
Heraeus Holding GmbH
Heraeusstraße 12-14
63450 Hanau
Phone +49 (0) 6181.35-5706
Fax + 49 (0) 6181.35-4242
E-mail: joerg.wetterau@heraeus.com
www.heraeus.com