

Press Release

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New technology expands ability to recycle precious metals

- **Strategic partnership between Heraeus and PhosponicS**
- **New adsorption technology efficiently reclaims precious metals from low-concentration waste**

Precious metals like platinum and rhodium are very valuable, and also very rare. That makes it increasingly important to recycle these precious metals from a wide variety of industrial uses. For example, various catalytic processes in the chemical industry generate large amounts of fluid residue containing low concentrations of precious metal catalysts.

The new adsorption process (scavenger technology) being offered in cooperation with the PhosponicS company in the UK will allow Heraeus to reprocess waste solutions that contain even low concentrations of precious metals. Up until now, it simply was not affordable or profitable to recycle them.

“This strategic partnership is another building block for us to offer our customers a broader range of precious metal recycling,” notes Dr. Joachim Kralik, Head of Chemical Process Development Recycling in the Heraeus Precious Metals Business Unit. Heraeus brings to the partnership its wide-ranging expertise with precious metals and many years of experience in recycling materials containing precious metals—especially from industrial catalysts. This cooperation means that Heraeus customers from the pharmaceutical, industrial, and specialty chemical industries will be able to optimize their processes, both ecologically and economically.

Together with PhosponicS, Heraeus offers a wide range of a new generation of select and efficient adsorption agents—called scavengers—to remove and recover precious metals from chemical products and waste solutions. Since this can accomplish precious metal output levels for process solutions in the single-digit ppm range (ppm = parts per million), even the slightest amounts of precious metal are retained and reused in the precious metals cycle, saving both resources and the environment.

New adsorption technology works like a “chemical magnet”

The scavenger process allows the efficient recovery, even for waste solutions with extremely low concentrations of precious metals. “With this process, it’s almost like we’re pulling finely distributed precious metal residue from the solution with a ‘chemical magnet.’ The precious metal is bound to the surface of the adsorption medium. We can reprocess that material with its valuable content using wet-chemical processes in a way that yields pure precious metal,” explains Dr. Kralik in simple terms.

In principle, the scavenger process can be used for all precious metals. This technology has already been successfully employed for heavily-diluted organic platinum and rhodium solutions from homogeneous catalytic processes from the chemical industry. Rhodium is principally needed for catalytic converters for the automotive industry, but also finds widespread application in the chemical industry because of its outstanding catalytic properties. Homogeneous catalytic processes using rhodium play an important role in the production of special chemicals (plasticizers, acetic acid, acetic anhydride, and pharmaceutical agents). Platinum catalysts are important for silicone production.

Background: Precious metals – rare and valuable

Mines produce more than 20,000 tons of silver and only around 2,400 tons of gold annually. Platinum metals are even rarer: Altogether, approximately 500 tons of these metals are extracted worldwide. The amount of platinum obtained each year—around 200 tons—would easily fit in a garage. And the 25 tons of rhodium mined annually, indispensable to the automotive and chemical industries, would fit under a desk. Heraeus has developed a special process for recovering the less familiar metals in the platinum family—not only platinum, but also palladium, rhodium, ruthenium, and iridium—that are used in many everyday applications. A closed precious metal cycle conserves resources and helps protect the environment. Also, because of ever-increasing demand for precious metals, mining has not been able to meet demand for some time; this makes recycling absolutely essential.

PhosphonicS Ltd is a spin out company from Queen Mary, University of London. PhosphonicS™ makes a diverse range of “functionalised” materials of which the metal scavengers represent one of the first examples. The metal scavengers are also finding increasing use in pharmaceutical and fine chemical production. Other applications under development include catalysis and membranes.

Heraeus, the precious metals and technology group headquartered in Hanau, Germany, is a global, private company with 160 years of tradition. Our fields of competence include precious metals, materials, and technologies; sensors; biomaterials; and medical products, as well as dental products, quartz glass, and specialty light sources. With product revenues of €4.1 billion and precious metal trading revenues of €17.9 billion, as well as more than 12,900 employees in over 120 subsidiaries worldwide, Heraeus holds a leading position in its global markets.

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Image explanation



From front to back, this image illustrates the scavenger before loading with precious metal; the red-orange sample with rhodium-loaded scavenger; the remaining scavenger free of precious metals after the precious metal has been separated in the Heraeus recycling process; and the resulting rhodium solution, from which the metal can be directly extracted. (Photo: Heraeus)