Precious Metals Refining

W. C. Heraeus
Heraeus has more than 150 years experience in handling and processing of precious metals. Wilhelm Carl (W. C.) Heraeus founder of Heraeus family businesses which opened their doors in 1851, provided profound expertise in Precious Metal Chemistry from it’s inception. From chemical processing to refining to the mechanical processing of precious metals, these areas have been the core activities of the Heraeus family-owned businesses. Precious Metal Chemistry is our area of expertise since then.

Our particular strengths are in Platinum Group Metals along with Ruthenium, Iridium, Rhenium and Osmium.

We refine precious metals for our customers from primary and secondary sources and produce fine metals according to international standards or sophisticated chemicals for various applications in homogenous and heterogenous catalysis.

Synergies resulting from our integrated processes and the strong support of the entire Heraeus group are cornerstones of our success.

Our past success combined with Heraeus’ long-term focus on precious metal chemistry provides stability as well as opportunity.
Africa provide sufficient and redundant treatment capacity close to our customers throughout the industry.

The Chemicals Division of Heraeus thus makes an important contribution to ensuring the supply of precious metals to you throughout the world.

Highly technological equipment, modern analytic and research instruments aimed for quality control and unique technological processes of treating precious metal containing materials allow Heraeus to produce competitive goods of high quality.

Today our company is a global leader, operating among the leading companies in refining services and precious metal products for a variety of applications. Well financed, with a strong commitment to chemistry with precious metals we have a long term strategy to stay and further expand this business field together with our customers.

Heraeus has established plants at several locations in key industrial areas for the extraction of precious metals originating from primary and secondary raw materials followed by the production of sophisticated products and fine metals according to the latest standards. Heraeus guarantees high refining yields and short processing times by using effective techniques and by maintaining a high level of investment in modern equipment.

Production facilities in Hanau, Germany, Santa Fe Springs/California, Wartburg/Tennessee, Newark/New Jersey, Udaipur/India, Shanghai/China, Hong Kong/China and Port Elizabeth/South Africa
We refine precious metal containing materials throughout the industry:

■ **Primary Concentrates**
Mining concentrates mainly rich in PGMs (Platinum Group Metals) and bullion concentrates.

■ **Spent Catalysts**
Heterogeneous catalysts on various substrates (i.e. carbon, alumina oxide) and homogeneous catalysts in different shape as well as ion exchange resins deriving from industries like petro-chemistry, chemistry, fine chemistry, pharmaceutical industry, nitric acid production in addition to exhaust gas purification.

■ **Alloys**
Alloys, doré, targets and used materials from the fields of dentistry, jewellery, sensors, electrodes, magnetic data storage, glass processing and laboratory ware.

■ **Secondary Concentrates**
Concentrates, intermediates, sweeps and precipitates.

■ **Electronic components and materials from the electronics, data storage and plating industry.**

  High grade electronic materials like connectors, MLCC, strips and capacitors as well as pastes, powders and surplus materials from production processes. Please contact the Heraeus staff for your refining needs.
Based on our experience and your description of material properties we are in the position to submit a comprehensive offer including treatment charges, recovery yields and metal availability schedule. For refinables with a more complex matrix we are more than happy to evaluate a sample of your material in order to analyse the matrix and define thereafter an appropriate treatment route. Furthermore we offer our assistance in your early process definition or R & D process in order to define the most economic refining route of your precious resources.

**Our services**

Toll refining or purchase of refining materials and/or refined metals, please choose your desired option.

A key factor in our operations is our team, performing all activities. Our team is characterised as follows:

- Highly motivated, internationally orientated in all business functions
- Technically and commercially customer orientated
- It’s easy to do business with Heraeus!

In order to allow you the maximum flexibility with respect to finance and metal disposition around the globe. We offer extremely close collaboration with Heraeus precious metal trading offices located at Hanau/Germany, New York/USA and Hong Kong the full range of services like metal leases, hedging transactions, metal transfers and physical shipments.
Sampling and Analysis

Sampling

Sampling and analysis is the key element for you, our valued customer. Appropriate and dedicated sampling and analytical equipment is used in order to prepare, homogenize and analyse a representative sample of your valuable material. These steps are most critical in determining the precious metal content in your material.

Depending on the quantity, material matrix and precious metal content of the incoming material the appropriate sampling process is chosen. Possible processes include sieving, milling, melting or solution sampling.

Dedicated equipment, sophisticated work procedures, well trained staff and decades of experience guarantee the best care of your precious metal!

During sampling you may send a representative in order to survey the sampling operations at Heraeus.
Sampling procedure for supported catalysts

1. Roller conveyor
2. Scale
3. Drum dumping device
4. Silo
5. Screening bed
6. Divider 9:1
7. Vibration conveyor
8. Magnetic separator
9. Rotary divider 9.5 : 0.5
10. Fines
11. Pellets
12. Iron
13. Oversize
14. Sample

Analytical Services

Well experienced and skilled personnel, sophisticated methods and most modern equipment are the basis for accurate analytical results.

At Heraeus we apply several different methods for example:

- classical wet-chemical methods
- fire assay
- instrumental methods such as
  - Atomic Absorption Spectroscopy (AAS)
  - Optical Emission Spectrometry (OES) including ICP and GDL
  - X-Ray Spectrometry (XRS) including WDX and XRF
Thermal reduction is an important step in the treatment of material containing Precious Metals. This process ensures the drying of material and the increase of precious metals concentrations and is therefore an essential foundation for the homogenization and sampling of material.

Especially spent heterogeneous and homogeneous catalysts such as carbon-catalysts, resins and sludges as well as precious metal containing items from the Electronics, Glass- or decorative coating industries are treated in this way.

Heraeus has recently invested in capacity expansion at the facilities in Hanau/Germany and Wartburg/Tennessee and thus has significantly increased the range of treatable materials.
In Hanau we have commissioned the HeraCYCLE® process for thermal processing.

This process is focused on the treatment of organic containing catalysts with high burning points originating out of the chemical, petrochemical or pharmaceutical industries.

The technology used in this robust unit is based on our substantial experience in the treatment of precious metals and is designed to facilitate treatment of materials with more and more complex and ever changing matrices.

We can ensure a professional treatment of all intake materials regardless of their consistency.

Heraeus is ready to convert your recovered metal into the precious metal compounds and homogeneous catalysts you need for your process.

The state of the art HeraCYCLE® process meets all regulatory standards and has been permitted without problems.

All material is treated in a batch process ensuring that each customer lot is treated separately and the contained precious metals can be balanced correctly.
Your valuable materials will be received, stored and processed under safe and secured conditions at all times while in the custody of Heraeus.

All pieces are registered without fail at the time of delivery. Once received all material is tagged with a unique identifier through our bar-coding system. The scales are integrated into the IT system and weights are transmitted directly. We can track at any time the location and process step in which your material is currently situated. Since this is an integrated IT system, all weights and bookings only have to be entered once and are further processed online. All material movements are therefore documented and can be easily traced.

Errors in weighing or transmission are eliminated.
The bar code system is always at your service. Bar code scanners and bar code labels are in place wherever and whenever your material is received, sampled, processed, analysed or stored.

Security of Precious Metals is guaranteed by the use of sophisticated technical systems like video control and dedicated work procedures.

All these systems are in line with insurance programmes and corresponding risk coverage that are in place.
Precious Metal Refining and Precious Metal Chemistry in general is the core business at Heraeus. Thus Heraeus makes an important contribution to ensure the supply of precious metals throughout the world.

The business portfolio of the Heraeus group enables us to offer a cycle business for our customers.

- **Trading**
  Procurement, hedging and leasing of precious metals.

- **Products**
  Homogeneous and heterogeneous catalysts, thin film materials, thick film materials, medical components, ceramic colours, alloys (dental, jewellery...), bonding wires etc.

- **Refining**
  A real synergy for our customers!
Precious metal containing materials from primary and secondary sources

1 Primary Concentrates
2 Spent Catalysts
3 Alloys
4 Secondary Concentrates
5 Electronic components and materials from the electronics, data storage and plating industry
6 Intermediates/Residues
7 Fine metals (Pt, Pd, Rh, Ru, Os, Re, Ag, Au)

A Sampling
B Thermal treatment
C Analysis
D Hydro- and pyrometallurgical treatment
E Purification

After separation and purification of the precious metals Heraeus delivers high purity products to meet internationally recognised standards such as ASTM.
Environmental compliance, protection and conservation is one of our top priorities.

Our refineries are in full compliance with any and all governmental – federal, state and municipal laws and regulations.

Regular audits and proactive monitoring ensure the highest level of standards for compliance is always maintained.

The refinery at Hanau for example has the status “preauthorised facility”, confirming compliance with all legal obligations and enabling our customers to send in refina-bles with minimum paperwork – it is easy to do business with us!

Daily shipments, handling, storage and treatment of hazardous material are handled by Heraeus professional experts.

Please ask for our support and guidance in logistics, transborder movements and notifications.

Furthermore we operate on the basis of quality management systems being certified according to DIN ISO 9001.
Team international

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