



Tailored Catalysts for Reliable Space Propulsion

Precision where every ignition matters

WHY CATALYSTS MATTER IN SPACE PROPULSION

Chemical propulsion systems remain indispensable for satellite attitude control, orbit correction and collision avoidance maneuvers due to their reliability and high specific impulse. In monopropellant thrusters, the catalyst initiates the rapid decomposition of the propellant, generating hot reaction gases that produce thrust without external ignition. Catalyst performance and especially catalyst stability therefore directly determine ig-

nition reliability, response time, thermal stability and operational lifetime of the propulsion system.

Heraeus Precious Metals provides heterogeneous catalysts tailored for space propulsion by combining precious metal chemistry, support engineering and scalable manufacturing to meet the demanding requirements of aerospace applications.



CATALYSTS THAT PERFORM WHEN RELIABILITY IS NON-NEGOTIABLE

Space propulsion systems operate under conditions where catalyst performance directly affects mission success.

A catalyst must provide:

- › **Fast and reliable ignition**
Rapid monopropellant decomposition with consistent performance throughout the mission.
- › **Thermal stability**
Reliable operation under repeated thermal cycling and high reaction temperatures.
- › **Long operational lifetime**
Stable catalyst performance over thousands of pulses and extended mission durations.
- › **Manufacturing consistency**
Controlled production processes ensure reproducible catalyst quality from laboratory development to industrial manufacturing.

WHY HERAEUS PRECIOUS METALS?

When mission reliability matters, catalyst consistency becomes essential. Heraeus combines decades of precious metal expertise with catalyst development, advanced characterization and controlled manufacturing to deliver customized catalyst solutions for demanding space propulsion applications.



Proven Reliability

Flight-proven catalyst materials designed for propulsion applications.



Secure Supply & Quality

Centralized manufacturing and consistent quality ensure space mission security.



Global Presence

Major thruster manufacturers worldwide rely on Heraeus' space catalysts.



Proven Expertise

Decades of heterogeneous catalyst development and precious metal know-how.

CATALYST SOLUTIONS FOR TODAY'S AND TOMORROW'S PROPULSION SYSTEMS

Monopropellant Hydrazine Thrusters (Iridium Catalysts)

- › Spontaneous ignition, high activity, excellent thermal stability
- › Reliable performance over long operational lifetime
- › Flight-proven in numerous space missions in the last decades



Type: H-KC12GA

- › Active Phase: Ir
- › Precious Metal Loading: > 30 %
- › Support Material: Alumina
- › Catalyst Form: Granules
- › Standard Size: 14-18 mesh
- › Available Size Range: 14-35 mesh

Hydrogen Peroxide Thrusters (Platinum Catalysts)

- › Efficient decomposition of H_2O_2
- › Supports lower-toxicity propulsion concepts based on H_2O_2 as alternative to hydrazine
- › Tailored for activity and durability
- › Suitable also for catalytic ignition systems and dual mode thrusters



Type: K-0176

- › Active Phase: Pt
- › Precious Metal Loading: 5 %
- › Support Material: Alumina
- › Catalyst Form: Granules
- › Standard Size: 10-14 mesh
- › Available Size Range: 10-35 mesh
- › Also available in pellet shape (3x3 mm)



LOOKING AHEAD

As the space industry explores pathways to reduce its environmental impact, alternative propellants and new spacecraft propulsion systems are creating new requirements for catalyst design and performance.

Heraeus is working with customers and partners on catalyst solutions that support:

- › Alternative monopropellants
- › Green propulsion concepts
- › Advanced catalyst materials
- › Customized catalyst development

LEARN MORE

Precision in Orbit:
Heraeus Catalysts Safeguard
Satellite Control

Read the full article on
[SpaceNews.com](https://www.spacenews.com)



ABOUT HERAEUS PRECIOUS METALS

Heraeus Precious Metals is one of the world's leading players in the precious metals industry. As part of the Heraeus Group, the company covers the value chain from trading to precious metals products to refining and recycling. It has extensive expertise in all platinum group metals as well as gold and silver.

With about 2,500 employees at 11 sites worldwide, Heraeus Precious Metals offers a broad portfolio of products that are essential for many industries such as the automotive, chemicals, semiconductor, aerospace, pharmaceutical and hydrogen industry.



CONTACT

Heraeus Precious Metals GmbH & Co. KG

Heraeusstrasse 12–14
63450 Hanau, Germany
chemicals@heraeus.com

www.heraeus-precious-metals.com