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MATERIALS

PRECIOUS METALS

Precious Metal Presentation

Precious metal thin films play a role in a variety of industrial fields. We provide high-purity sputtering targets and vapour deposition materials in shapes and sizes to suit every application.

We can supply the following precious metals:

Gold pellets

Au 79 GOLD

The most malleable of all metals, gold can be processed into fine wire or thin foil. With an extremely high infrared ray reflectivity of 98.4%, thin films of gold are used in the space shuttle to protect the crew from the infrared rays of the sun.

Melting point	1 064.18°C
Boiling point	2 800°C
Density	19.32 g/cm^3
Electrical resistance	2.2.10^{-6} Ω.cm
Thermal conductivity	319 W.m^{-1}.K^{-1}
Vickers hardness in annealed state	22
Thermal expansion coefficient	14.2.10^{-6}/°C (20-100°C)
Tensile strength	108 MPa
Elongation	42%

Ir 77 IRIDIUM

The increased hardness and anti-corrosion properties when alloyed with platinum and palladium have been applied to fountain pen nibs and balls for ball pens.

Melting point	2 446°C
Boiling point	4 527°C
Density	22.56 g/cm^3 (20°C)
Thermal conductivity	147 W.m^{-1}.K^{-1}
Vickers hardness in annealed state	220
Thermal expansion coefficient	6.4.10^{-6}/°C (20-100°C)
Tensile strength	1 088 MPa

Pd 46 PALLADIUM

Palladium can absorb 350-850 times its own volume of hydrogen (at room temperature). With good permeation properties, palladium exhibits unique capabilities in high-purity hydrogen manufacturing equipment.

Melting point	1555°C
Boiling point	3167°C
Density	12.16 g/cm³ (20°C)
Thermal conductivity	72 $W.m^{-1}.K^{-1}$
Vickers hardness in annealed state	41
Thermal expansion coefficient	$11.8.10^{-6}$/°C (20-100°C)
Tensile strength	170 MPa
Elongation	40%

Pt 78 PLATINUM

Platinum performs a variety of roles from vehicle exhaust gas purification catalyst to the basis of cancer-fighting agents. It is one of the precious metals with tremendous undiscovered powers.

Melting point	1768°C
Boiling point	3827°C
Density	21.37 g/cm³
Thermal conductivity	72 $W.m^{-1}.K^{-1}$
Vickers hardness in annealed state	41
Thermal expansion coefficient	$8.8.10^{-6}$/°C (20-100°C)
Tensile strength	123 MPa
Elongation	40%

Rh 45 RHODIUM

Chemically stable, rhodium will dissolve gradually in aqua regia when in a powder form, but will not dissolve in acid or aqua regia when in a solid form. Rhodium plating plays a large role in searchlight reflectors and elsewhere performs a decorative function.

Melting point	1963°C
Boiling point	3727°C
Density	12.44 g/cm³ (20°C)
Thermal conductivity	150 $W.m^{-1}.K^{-1}$
Vickers hardness in annealed state	101
Thermal expansion coefficient	$8.2.10^{-6}$/°C (20-100°C)
Tensile strength	695 MPa
Elongation	5%

Ru 44 RUTHENIUM

Hydrogen is formed through the breakdown of water by the sun's rays in a non-polluting hydrogen energy system that stores hydrogen as fuel. Hopes are rising that ruthenium will act as the essential catalyst to realize this future energy source.

Melting point	2250°C
Boiling point	3900°C
Density	12.06 g/cm³ (20°C)
Thermal conductivity	105 $W.m^{-1}.K^{-1}$
Thermal expansion coefficient	$9.1.10^{-6}$/°C (20-100°C)

Ag 47 SILVER

Silver is used in large quantities in the form of silver nitrate as a photographic sensitive material. This metal also has the most superior reflectivity of visible light rays of any metal. For this reason, silver is used in mirrors requiring high light reflection.

Melting point	961.78°C
Boiling point	2210°C
Density	10.50 g/cm³
Electrical resistance	$1.62.10^{-6}$ Ω.cm
Thermal conductivity	428 $W.m^{-1}.K^{-1}$
Vickers hardness in annealed state	24
Thermal expansion coefficient	$18.9.10^{-6}$/°C (20-100°C)
Tensile strength	147 MPa
Elongation	51%

Vacuum Deposition Materials

We supply materials for the physical vapor deposition as pure elements or alloys upon customer request.

FEATURES

- Sputtering target materials without pinholes, oxides or gases.
- High-purity precious metal vapor deposition materials can be processed into granules, blocks, rods, wires and other forms.

TYPES

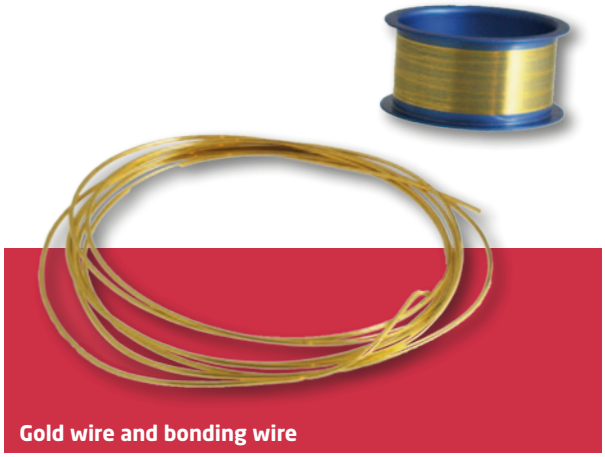
	STANDARD ITEMS	HIGH PURITY ITEMS	TYPICAL ALLOYS
Gold series	4N	5N+	AuAg, AuCo, AuGe, AuPd, AuSb, AuSi, AuSn, AuZn...
Platinum series	3N5	5N+	PtRh, PtPd, PtCo, PtNi, PtCu...
Iridium series	3N	4N+	IrMn
Rhodium series	3N	4N+	-
Palladium series	3N5	4N+	AuPd, PdNi, PtPd
Ruthenium series	3N	4N+	-
Silver series	4N	5N+	AgAu, AgCu, AgGe, AgGeSn, AgNi, AgSi...

Silver pellets

Platinum pellets

APPLICATIONS

Thin film for die-bonding, LED (electrodes), quartz crystals (patterning electrodes), CD-R, DVD, gate electrodes for electronic devices, electrodes for electronic devices and oxide dielectric elements, etc.



Gold wire and bonding wire

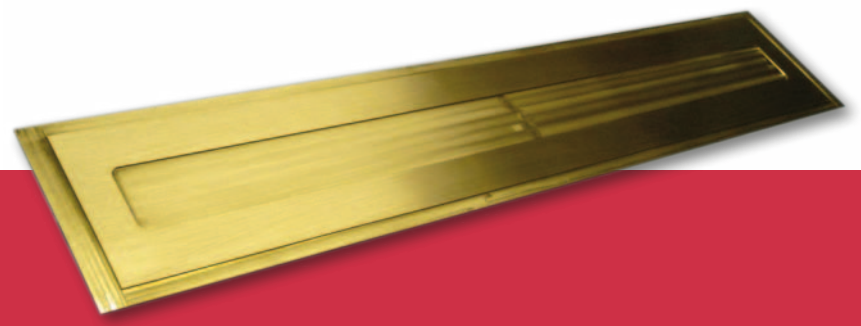
DELIVERY FORMS

- Pellets (diameter 3 mm x 6 mm long kept in inventory for Au, Pd and Pt)
- Tube
- Rod
- Target
- Wire [evaporation wires and bonding wires (from 18 µ diameter)]
- Foil
- Ribbon
- Cone
- Others on request

Please ask for your dimensions.

All sputtering targets and evaporation materials dedicated to vacuum thin films are delivered along with a specific certificate of analysis.

Sputtering Targets



We provide high-purity sputtering targets in sizes to suit every application:

- flat targets, all diameters and dimensions:

- reinforced targets according your magnetron:

Au 79 GOLD Base

CHEMICAL	FORMULA	PURITY*
Gold	Au	99.99/99.999
Gold Germanium (88:12)	AuGe	99.999
Gold Palladium (60:40)	AuPd	99.99
Gold Tin (70:30)	AuSn	99.99
Gold Zinc (92:8)	AuZn	99.99

Ir 77 IRIDIUM Base

CHEMICAL	FORMULA	PURITY*
Iridium	Ir	99.8/99.95
Iridium Manganese (20:80)/(75:25)/(80:20)	IrMn	99.95

Pd 46 PALLADIUM Base

CHEMICAL	FORMULA	PURITY*
Palladium	Pd	99.95/99.99
Palladium Nickel (90:10)	PdNi	99.95

Pt 78 PLATINUM Base

CHEMICAL	FORMULA	PURITY*
Platinum	Pt	99.95/99.99
Platinum Palladium (50:50)	PtPd	99.99

Rh 45 RHODIUM Base

CHEMICAL	FORMULA	PURITY*
Rhodium	Rh	99.8/99.95

Ru 44 RUTHENIUM Base

CHEMICAL	FORMULA	PURITY*
Ruthenium	Ru	99.95

Ag 47 SILVER Base

CHEMICAL	FORMULA	PURITY*
Silver	Ag	99.99/99.999
Silver Germanium (96:4)	AgGe	99.995
Silver Germanium Tin	AgGeSn	99.995

Other alloys and purities are available on request.

*See Section D - Sputtering Targets in this catalogue for additional services such as **Backing Plates** and **Bonding of Sputtering Targets**.*

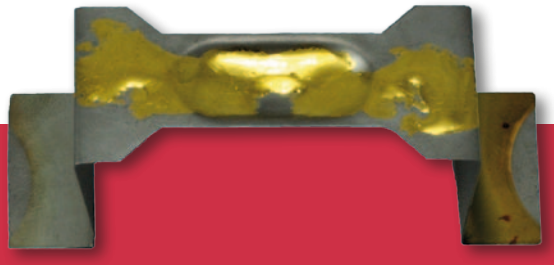
*Purity based on metallic impurities.

Precious Metal Recycling

Precious metals are found in many shapes and forms in the products that surround us. We cover all aspects, from the recovery and refining of scraps to re-manufacturing into products.

We accept for recycling all scraps containing:

- Gold, Au
- Platinum, Pt
- Palladium, Pd
- Silver, Ag
- Iridium, Ir
- Ruthenium, Ru
- Rhodium, Rh



Melted gold on evaporation boat

FEATURES

- Physical return and delivery as precious metal products.
- Proper equipments for any form of scraps.
- Management of scraps as a valuable based on international environmental standard.
- Crushing scraps accepted.
- Recycling and precision cleaning of vapor deposition multiple layers is also available.

We will quickly determine the value and transfer the pure metals to you on your weight account.