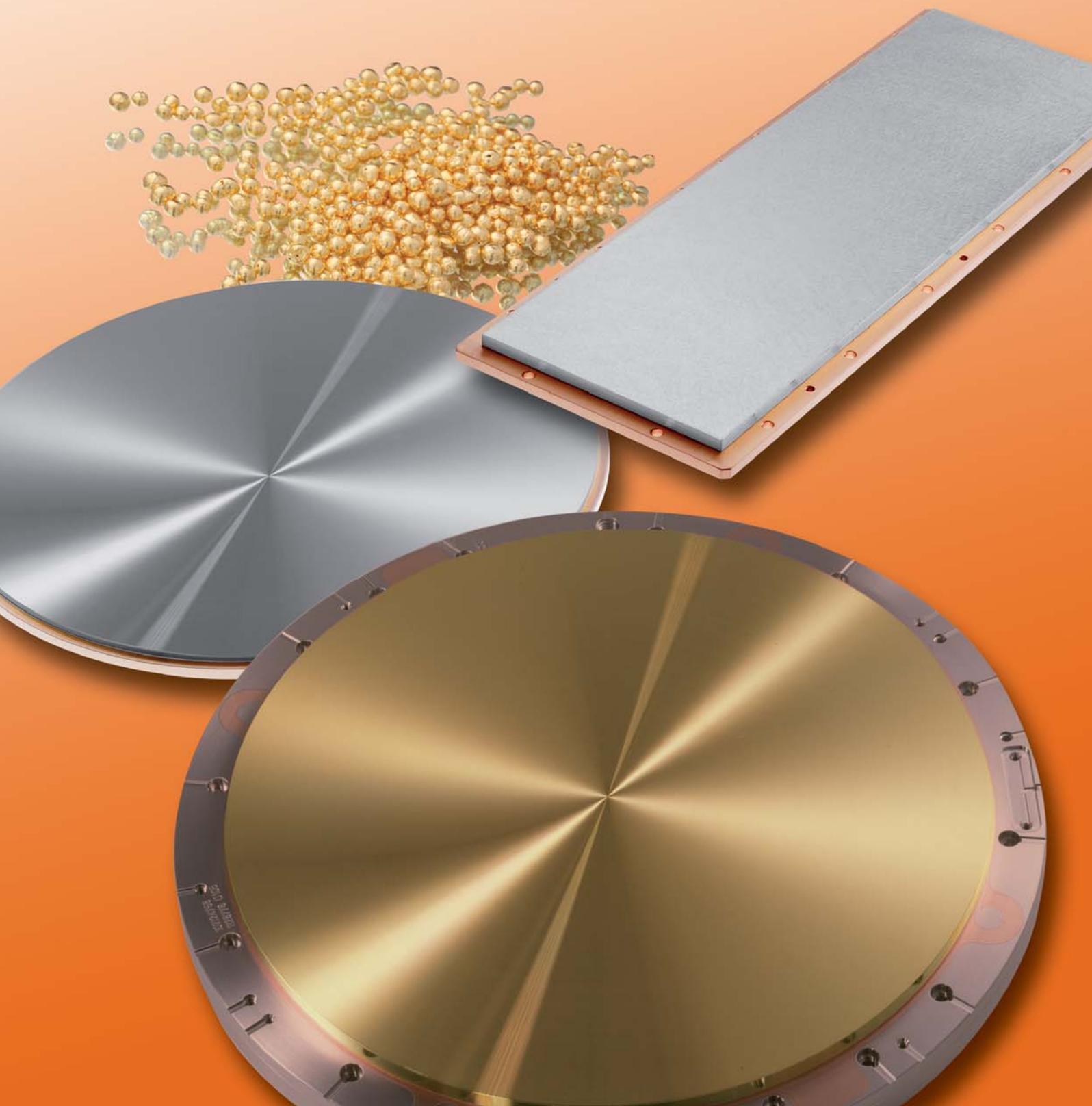


Precious Metals for Semiconductor Applications



Umicore Thin Film Products

Umicore Thin Film Products, a globally active business unit within the Umicore Group, is one of the leading producers of coating materials for physical vapor deposition with more than 50 years experience in this field. Its Semiconductor portfolio covers a wide range of highly effective sputtering targets and evaporation materials.

Precious Metals (PMs) e.g. Silver, Gold, and Platinum are used in the field of Semiconductors and Microelectronics. PMs thin film layers can serve as barrier against oxidation for retaining good electrical connectivity, as medium for soldering, as electrical contact layer, as alloy constituent for semiconductor effects e.g. in Schottky or Zehner Diodes, connecting layers, as a base for wire bonding, and for other applications.



Au sputtering target



Au wire



Au starter slug in mo liner

Precious Metals for Semiconductor Applications

Supported Precious Metals by Umicore Thin Film Products

Silver, Gold, Platinum, Ruthenium, Iridium, Palladium, and selected alloys for sputtering targets or evaporation.

Production Process

Most of the PMs can be processed by melting, casting, and subsequent thermo-mechanical transformation. For some PM-alloys and selected PMs, e.g. Iridium, powder processing is the established processing route. Umicore TFP can provide products manufactured with state of the art processes best suited for each individual PM or PM-alloy.

Analysis

All materials are tested in our leading edge analytical laboratory or one of our associate laboratories:

- › Hot gas extraction (LECO)
- › Induction coupled plasma optical emission spectrometry (ICP-OES)
- › Glow discharge mass spectrometry (GDMS)
- › Metallographic investigation

Density

In all products obtained by melting and casting full density (100% of theoretical) is obtained. Products manufactured by the powder metallurgical process are provided with the highest possible density available according to best know practice.

Microstructure

Fine grain microstructure is a key factor influencing the sputtering behavior of a target and the uniformity of the sputtered layer. Our products are optimized for uniform grain distribution, and grain size has been optimized individually to PMs and applications for best economical benefit to customer.

Composition

PM-alloys such as AuAs_x, AuGe_x, AuSn_y, AuZn_z, are generally used to reduce the melting temperature and are typically applied with eutectic composition. We provide sputtering targets and evaporation materials of selected compositions.

Purity

The purity of PMs depends on the established purity of PMs available on the market and the ability to purify them to a higher level. Generally, higher purity will result in significantly higher price and may increase the lead time depending on the time needed for purification. We provide Ag, Au, and Pt with typically 4N (99.99%) purity.

Dimensions

Due to our dynamic management processes, dimension for sputtering targets up to Ø 450 mm (active surface) can be realized within a short period of time. Various geometries, also rectangular up to a length of 900 mm, are available.

Bonding

Umicore Thin Film Products uses its own proprietary bonding method, based on a flux-free solder technique. Thin film adhesion and diffusion barrier layers are applied to the back of each target, followed by a temperature controlled metallic solder seal between target and backing plate. The bonding is compliant to accommodate mechanical and thermal stress.

Packaging

Final cleaning and packaging is completed under clean-room conditions. All targets are vacuum sealed in argon-filled polyethylene bags, guaranteeing consistent target performance, even when stored for a longer period of time.

Evaporation Materials

Standardized products are available from stock for small quantities. A variety of shapes, such as granulate, discs, wires have been established to serve different PVD applications. PM-alloys are available, but the enrichment of one element based on different evaporation pressures of the individual constituents is well known and needs to be addressed during process design (e.g. AuGe12wt%).

Precious Metal Services

Based on a well trained world wide sales team we are able to collect any spent targets around the world for recycling. Our service provide full transparency to customer including monitoring recycling output and allocating customer specific weight of recycled products to newly fabricated products or feeding customer pool account for later processing. We are supporting also world wide PMs procurement. Upon customers request we can provide recycling of shields with local partners.

Quality Assurance

The Balzers location is certified according to ISO 9001:2000, ISO 14001:2004 and OHSAS 18001:1999 standards. Other production sites are also ISO 9001:2000 certified. Documentation, process specifications, traceability, sophisticated analytical methods, and continuously trained employees guarantee the highest and most consistent product reliability.



Au granulate



Pt discs

Please find your local sales partner at:
www.thinfilmproducts.umicore.com

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