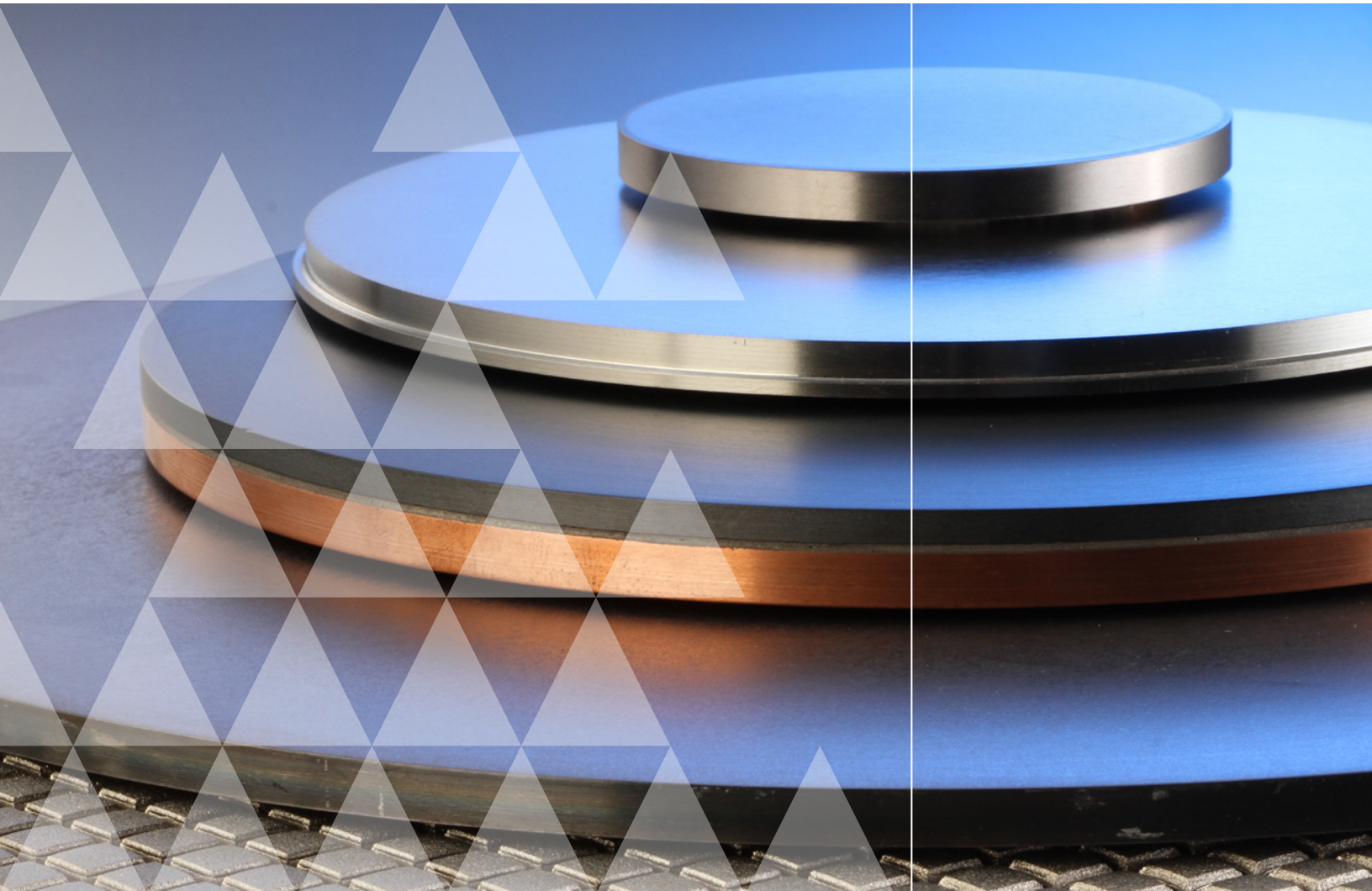




MATERION



**ADVANCED
MATERIALS**

MEMS Materials

MEMS Materials

The Challenge

The increased performance and functionality of next generation MEMS devices will require PVD materials with even higher purities and more precise stoichiometries than those currently available. Furthermore, PVD materials will need to be highly engineered in order to meet the exacting film characteristics and uniformities required by the industry. The development of these critical materials will compel MEMS manufacturers to seek a partner from a strong R&D culture specializing in PVD alloys. This supplier should have extensive expertise in materials specifically developed for complex semiconductor processes.

The Solution

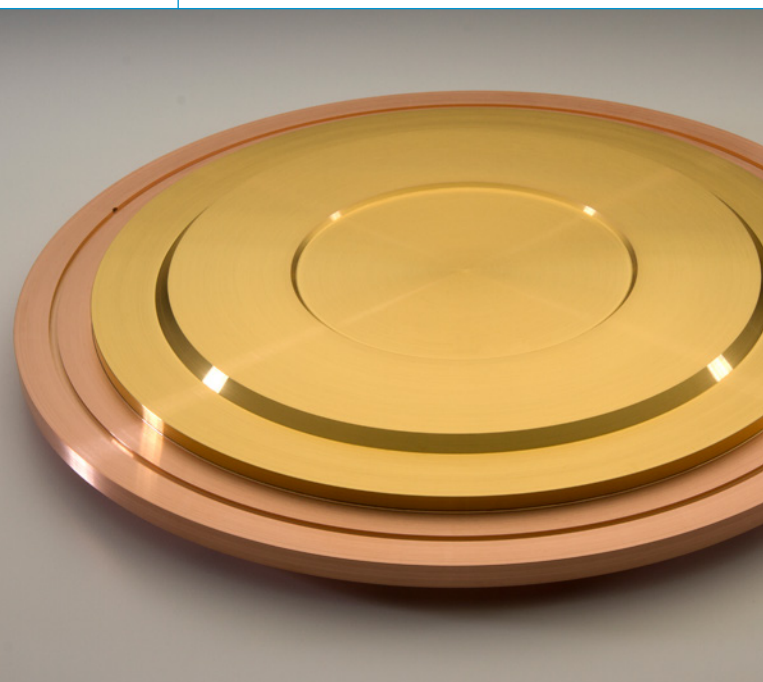
Materion offers customized products & capabilities to meet customer requirements for purity and chemistry, deposition properties and consistency, quality, reliability and cleanliness.

- Market-leading value in precious metal & non-precious metal sputtering targets
- R&D team that has developed hundreds of new alloys and compounds for the semiconductor, MEMs, and memory industries
- Robust manufacturing processes rigorously monitored to ensure product cleanliness and reliability

BENEFITS

With our expertise in semiconductor and thin film materials, we offer these advantages:

- Leadership in the supply of precious metals to the MEMS industry
- Development of high purity and alloyed gold PVD materials
- Enhanced sputter target designs to extend life and reduce cost of ownership
- Full cycle precious metal management
- Reclaim and refine with flexible settlement options
- Highly engineered targets for enhanced uniformity & reduced film defects
- Manufacturing capabilities to ensure a constant supply chain for disaster recovery



Materion ... Making Advanced Materials that Improve the World.



SPUTTERING TARGETS

Available Materials

- Precious Metal
 - Au, Ag, Pt, Pd, Ru, Rh, Os, Ir
 - Standard & custom alloys
- Non-precious Metal
 - Cr, Ti, Ta, Cu, Al, Ni
 - Custom alloys
- Sputtering Targets with Customized Chemistries such as PZT
- Magnetic Materials
 - NiFe, CoNi, NiPt, FePt

Available Forms

- Custom Size Planar & Rotary Targets
- Support all OEM Platforms
- Extended Life Designs

RELATED SERVICES

- Sputtering Target Bonding
- Custom Backing Plates
- Plating Anodes
- Security Audits

EVAPORATION MATERIALS

Available Materials

- Precious Metals
 - Au, Ag, Pt, Pd
 - Non-precious Metals
 - Cr, Ti, Ta, Cu, Al, Ni
- EVAPro™ Grade High Performance Materials
- Custom & Select Alloys
- Customizable Purity Levels Up to 5N

Available Forms

Pellets, Slugs, Starter Chargers & More

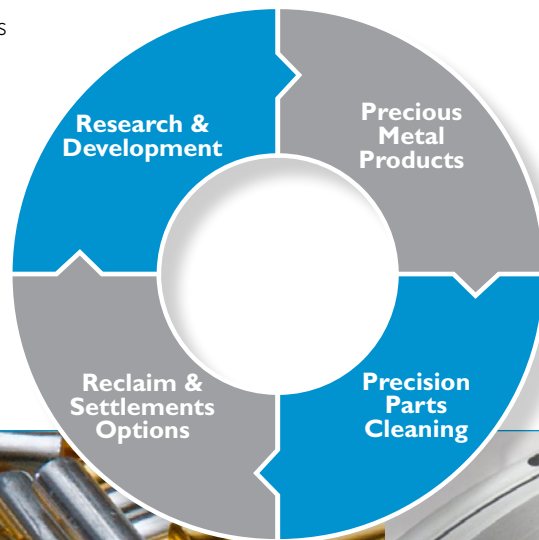
FULL CYCLE PRECIOUS METAL MANAGEMENT

- 100 years experience refining, recycling & recovery of metals
- Vacuum chamber shield cleaning
- Aluminum, copper & other custom vacuum shield cleaning
- Twin Wire Arc Spray (TWAS)
- Valuable materials reclaimed and refined to purest forms
- Flexible R & R settlement options

ENVIRONMENTAL LEADERSHIP

All of our disposal procedures comply with state & federal regulations. Certified:

- ISO 9001:2008 Quality Systems
- ISO 14001:2004 Environmental Safety & Management Systems
- ISO 17025:2005 Analytical Laboratory
- Lean Sigma
- Certified Conflict-Free Metals



Examples of Thin Film Deposition Materials for the MEMS industry

Au	Al	NiPt	SiGe	PZT
AuSn	Pt	Mo	SiN	NiCr
AuGe	Ag	TaN	SiO ₂	Au Alloys
AuZn	Pd	Ta	SiC	Ag Alloys
WTi	Ti	Nb	Ru	Ni Alloys
Ni	Cu	Si	Oxides	Al Alloys
Cr	W	Ge	Indium	
NiFe	CoNiFe	NiPt	FePt	

Thin Film Deposition Products

Powders	Grain	Pieces	Wire/Rods	Starter Charges
Pellets	Shot	Slugs	Premelts	Sputtering Targets

Element	Symbol	Atomic #	Sputter Yield (atoms/ion)	Density g/cc	Ion Beam Etch Rate (Å/min)
Carbon	C	6	0.36	2.25	110
Aluminum	Al	13	1	2.7	640
Silicon	Si	14	0.5	2.33	370
Titanium	Ti	22	0.5	4.54	330
Chromium	Cr	24	1.2	7.19	530
Nickel	Ni	28	1.3	8.9	530
Copper	Cu	29	2	8.96	880
Germanium	Ge	32	1.1	5.32	920
Niobium	Nb	41	0.7	8.57	470
Molybdenum	Mo	42	0.7	10.2	410
Ruthenium	Ru	44	1.2	12.4	610
Palladium	Pd	46	2	12	1100
Silver	Ag	47	2.8	10.5	1800
Tin	Sn	50	1.2	7.31	1200
Tantalum	Ta	73	0.62	16.6	420
Tungsten	W	74	0.6	19.3	340
Platinum	Pt	78	1.1	21.4	620
Gold	Au	79	1.7	19.3	1080



MATERION

ADVANCED MATERIALS

2978 Main Street
Buffalo, NY 14214 USA
Phone: +1 800.327.1355
advancedmaterials@materion.com
www.materion.com/advancedmaterials

Europe: +44.1635.223838
Asia: +886.3.2226350

MATERION CORPORATION
www.materion.com

MATERION ADVANCED MATERIALS is an industry leader in microelectronic packaging for the semiconductor, MEMS, wireless & LED markets. We manufacture lids, frames, solder & braze alloys, precious metal targets, and evaporation materials to meet the broadest range of customer requirements. In addition to developing innovative packaging products, we offer related services to support your business needs including precision parts cleaning, precious metals refining & recycling, and sputtering target bonding.