WOLFTEN

SPUTTERING TARGETS

We offer sputtering targets intended for mass production and research

We offer sputtering targets of various shapes and sizes. All products fit the majority of available device on the market. Upon your request we can provide products with specific requirements as well as custom-made products manufactured to exacting client specifications and standards.

Our materials are ultra-pure with clarity from **99,5%** up to **99,999%** - depending on technological properties of the metal or alloy.

All materials are provided with appropriate certificates stipulating their tested purity.

We offer targets in a form of discs, ingots or sleeves and tubes

Our offer consists of pure metal targets as well as various alloys.

There are targets made out of more than a single material.

*Due to high reactiveness, some of the offered targets may require special packaging, transportation or storage measurements.

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Sputtering as one of the PVD processes

Sputtering is a Physical Vapor Deposition technique used to deposit thin layers of a material onto a surface or a substrate. These methods are applicable in many branches of industry and production processes.

PVD allows uniform deposition of the coating layer on elements with complicated shapes through the processes such as sputtering or evaporation.

PVD is used to protect, modify or even upgrade the original surface of the material. This technology is used across many different industries with the flagship being electronics (semiconductors), photovoltaics (thin-film solar cells) as well as cutting tools' razors covered with titanium nitride.

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5 B BORON	6 C CARBON	12 Mg MAGNESIUM	13 Al ALUMINIUM	14 Si SILICON	20 Ca CALCIUM	22 Ti TITANIUM	23 V VANADIUM
24 Cr CHROMIUM	25 Mn MANGANESE	27 Co COBALT	28 Ni NICKEL	29 Cu COPPER	30 Zn ZINC	34 Se SELENIUM	38 Sr STRONTIUM
39 Y YTTRIUM	40 Zr ZIRCONIUM	41 Nb NIOBIUM	42 Mo MOLYBDENUM	44 Ru RUTHENIUM	45 Rh RHODIUM	46 Pd PALLADIUM	47 Ag SILVER
48 Cd CADMIUM	50 Sn TIN	51 Sb ANTIMONY	52 Te TELLURIUM	56 Ba BARIUM	58 Ce CERIUM	60 Nd NEODYMIUM	62 Sm SAMARIUM
65 Tb TERBIUM	68 Er ERBIUM	73 Ta TANTALUM	74 W TUNGSTEN	75 Re RHENIUM	78 Pt PLATINUM	82 Pb LEAD	83 Bi BISMUTH

Sputtering process takes place in a low pressure environment by expulsion of target molecules being struck by ionized inert gas, such as argon or neon. These molecules freely fly across the chamber until they are eventually deposited on the substrate's surface.

The proces happens in a closed, remotely controlled vacuum chamber.

KINDS OF THIN-FILM LAYERS

SIMPLE

Al Cu Ti TiC Ag, etc.

COMPLEX

multicomponent alloys
VN ZrN HfN z C

multiphase
TiN Ti_2N

composite materials
TiC Al_2O_3

multilayer
TiC TiN ZrN

gradient layers
TiN Ti(CN) TiC

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Different PVD methods are used for different applications. Typically, however, the process takes place under the following conditions:

- range of temperatures: 30 – 500°C,
- vacuum: 0,1 – 100 Pa,
- ion energy: 0,01 - 1000 eV,
- accelerating voltage: 0,5 – 5 kV.

Standard size targets' diameters range from 2,54 mm to 203,3 mm.

Some materials show high brittleness or low thermal conductivity, hence it is recommended to cohere them to the high-purity copper discs with indium based glues.

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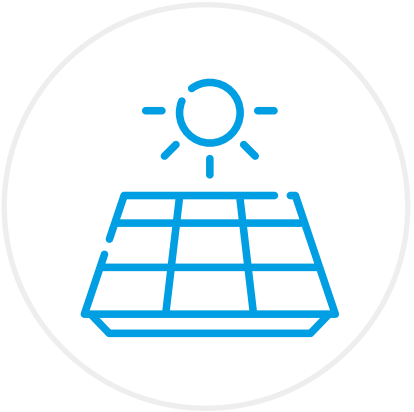
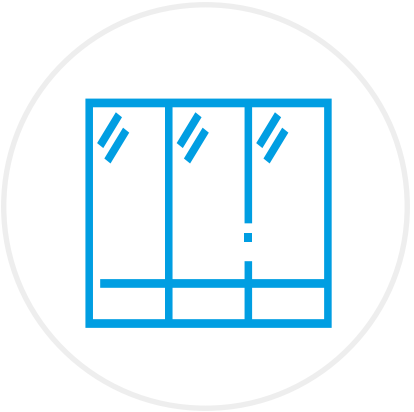
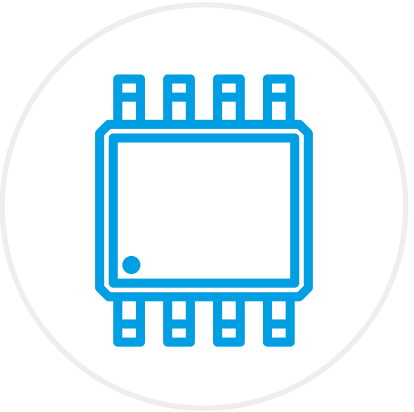
Usage of vacuum deposition



SOLAR PANELS



AUTOMOTIVE AND ARCHITECTURAL GLASS



SEMICONDUCTORS

SCANNING ELECTRON MICROSCOPY

FLAT PANEL DISPLAYS

COMPLICATED DETAILS AND ELEMENTS

MAGNETIC STORAGE DEVICES

FIBER-OPTIC COMMUNICATION

Advantages of vacuum sputtering

- This method may be used for conductive materials as well as isolators, and applied on any surface including metals, ceramics, glass or plastics.
- High precision of coating application.
- Full control over layer thickness (applicable to semi transparent thin layers, fully covered, different color variation).
- Leveling any unevenness on the material surface.
- Environmentally friendly process - doesn’t produce any pollutants or toxic substances.
- Metal coating does not require nickel, hence it is neither carcinogenic nor sensitizating.
- Layers keep their chemical composition and the process does not influence the chemical conversion of the material.

Different PVD methods

There are currently several methods of PVD, which allow obtaining a nanometric scale of the layers.

PVD process composes of three main stages.

1. Production of metal vapors.
2. Transfer of molecules onto the substrate.
3. Deposition of the molecules to create a film layering.

Different PVD methods may vary in certain aspects:

- placement of the source of expulsion and ionization of the vapor,
- creation of metal vapors through evaporation, sublimation, cathode or anode sputtering,
- the way the vapors are deposited on the substrate
- existence or lack of process intensification – active, reactive or mixed.

Methods of physical vapor deposition

Evaporation

The source material evaporates in a vacuum, which allows the particles to traved directly to the substrate and condense back to a solid state. Evaporation is applied for microlayers and macro producs, i.e. metalized polyester film.

Ion Platering

Vapor deposition occurs with higher ionization level (comparing to unassisted evaporation processes). Ion platering uses concurrent or periodical target bombardment and deposits an atom thick layers.

Ion Sputtering

This method is also known as cathode sputtering and it is a phenomenon where atoms are expelled from a solid surface by ionized and accelerated molecules hitting the target. This method is used to make a thin layer on a hard surface and for ion etching.

Magnetron Sputtering

This is a high-rate vacuum coating method used for materials with high melting point. It uses a specially formed magnetic fiels applied to a sputtering target.

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I am at your disposal

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