

EXPLORE, INSPIRE,
DELIVER. REPEAT.™



MATERION

Materials for Solar
Energy Applications





Materials for Solar Energy Applications

It is critical that materials used for thin film solar applications are of the highest quality. Whether your application is thin film, crystalline silicon, concentrated photovoltaic or concentrated solar power, a high quality material enables reliable device performance and durability. It's also important to select the most appropriate materials to maximize performance of absorber, reflector, antireflective, back contact, buffer, high temperature and TCO thin films.

Materion is one of the world's leading producers and developers of materials for thin film technology. We offer:

- A broad range of highly engineered precious metal and non-precious metal sputtering targets, ceramic and inorganic compound sputtering targets, evaporation materials, and inorganic chemicals
- High-purity materials with optimized microstructure for complete coverage
- Materials with consistent quality for extended product life
- Customization capability to match appropriate materials for highest performance

BENEFITS

Materion offers the convenience of multiple global locations.

- 20+ years servicing the solar energy market
- Targets for all key layer systems used in photovoltaic applications
- Materials designed for CIGS, CZTS & Cadmium Telluride (CdTe) technologies for large scale production
- Materials already proven to increase device efficiencies
- Related services include shield kit cleaning, target bonding and refining & reclaim

APPLICATIONS

- Thin Film Solar Cells
- Concentrated Photovoltaic (CPV)
- Concentrated Solar Power (CSP)
- N&P Layers
- Back Contact and Interconnects
- Buffer and TCO Layers
- High Temperature Coatings
- Heliostat Reflectors
- Reflective Coatings in Mirrors

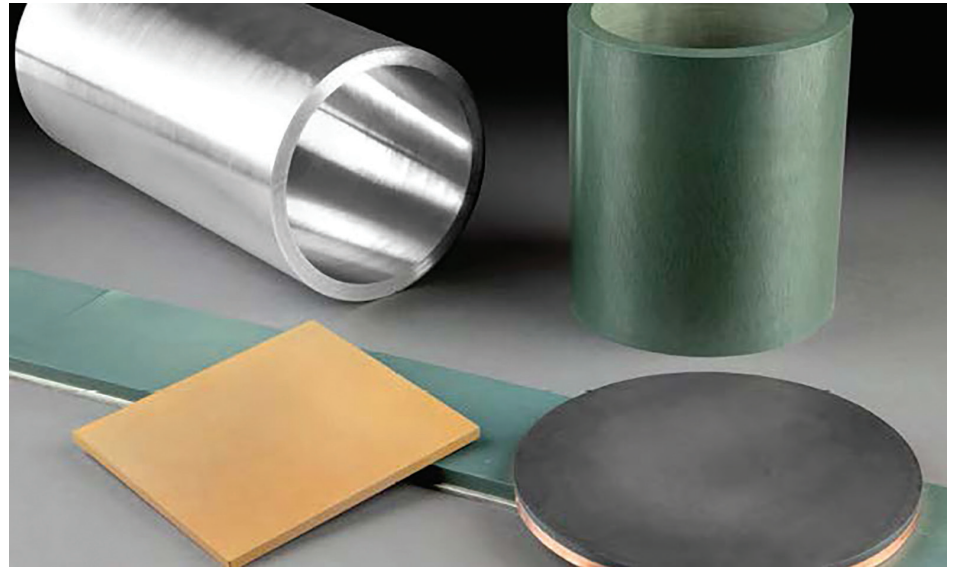
SPUTTERING TARGETS

AVAILABLE MATERIALS

- Precious metal and non-precious metal
- Standard and custom exotic alloys
- Ceramic and inorganic sputtering targets with customized chemistries
- Cadmium containing materials

AVAILABLE FORMS

- Planar & rotatable targets produced by cast or spray for large area coating
- Custom alloys and compositions
- Multiple shapes & sizes
- Extended life designs



EVAPORATION MATERIALS

SHOT, WIRE, ROD, PELLETS, SLUGS & PIECES:

- Precious and non-precious metals & alloys
- Inorganic chemicals
- Customizable purity levels up to 5N
- EVAPro™ high performance metals
- Specialty ceramics
- Custom alloys

CONCENTRATED PHOTOVOLTAIC (CPV) MATERIALS

HIGH PURITY PRECIOUS METAL SLUGS AND/OR PELLETS:

- Gold (Au) metal and alloys
- Silver (Ag) metal and alloys

THIN FILM PHOTOVOLTAIC MATERIALS

NON-PRECIOUS MATERIALS:

Options for crystalline and amorphous silicon designs:

- Full Alloy CuInGaSe
- Full Alloy CuGa
- Binary and Ternaries
- Transparent Conductive Oxides (TCO), such as Cd_2SnO_4
- Indium & Indium Alloys
- Cadmium Sulfide
- Copper & Copper Alloys
- Zinc & Zinc Alloys
- Zinc Telluride
- ZAO
- Tin and Tin Alloys
- Back Contact Metals & Alloys
- Buffer Layer Materials
- Additional materials available upon request

CONCENTRATED SOLAR POWER (CSP) MATERIALS

Offerings for heliostat builders employing parabolic and flat reflectors:

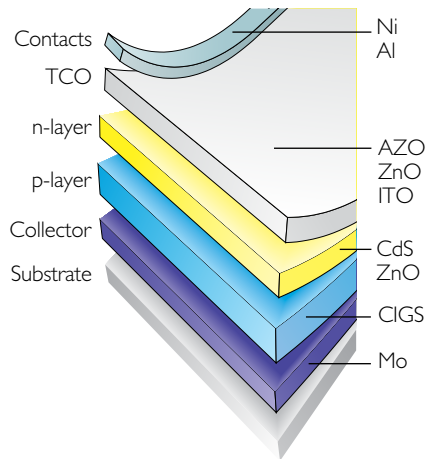
- Silver & aluminum source material for single and multilayer reflector technologies
- Durable antireflective materials such as titanium oxides, aluminum oxides, and more



MATERIALS FOR PHOTOVOLTAIC APPLICATIONS

Materion supports the solar industry with a variety of specialized materials and sputtering targets for key layer systems used in photovoltaic applications. Our broad manufacturing capabilities allow us to offer custom materials for Thin Film Solar, Silicon (HJT – Heterojunction Technology) and Compound Semiconductor Based (II-VI and III-V) technologies. As one of the world's leading producers and developers of thin film materials, we anticipate our customers' needs for innovative materials to meet their specific challenges.

CIGS

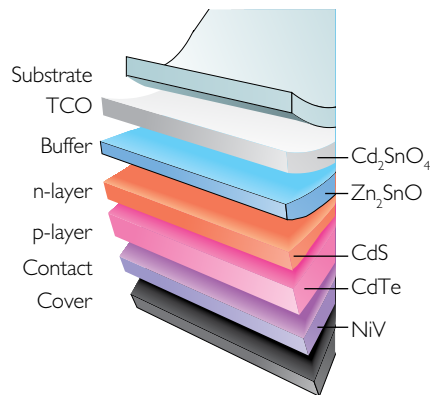


CIGS/CIS Solar Cell Options

- CuInGaSe*
- ITO
- In
- AZO
- CdS
- Si
- CuGa Alloys
- NaF
- ZnAl
- CuGaSe
- ZnO
- CuIn
- CuGaSe:Na
- In₂S₃
- Mo
- CuInSe₂
- (ZnMg)O
- CuSe
- In₂Se₃
- Cu₂Se
- ZnS

*Materion provides four element CIGS compositions.

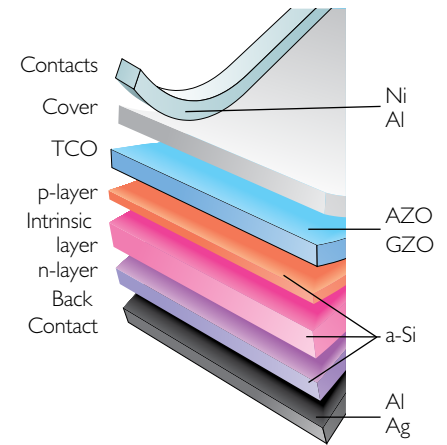
CDTE



CdTe SOLAR CELL OPTIONS

- ZTO
- CdTe
- CdSn
- Ni Alloys
- ZnSn
- CdS
- NiV
- Cd₂SnO₄
- ZnTe
- Zn₂SnO₄
- Sb₂Te₃
- Mo
- Ti
- Al
- Cr
- Cu
- Zn
- Sn
- CdZnTe
- ZnMg
- ITO
- Si
- SiAl
- ZnO

A-SI & MULTI-JUNCTION



AMORPHOUS-Si & MULTI-JUNCTION SOLAR CELL OPTIONS

- TCO
- Ag
- AZO
- Ag Alloys
- Al
- GZO
- NiV
- Ni
- Ti
- Si
- SiAl
- Mo
- ZnO
- ITO

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