

Indium Tin Oxide (ITO) for Evaporation



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 vapour deposition, with more than 50 years of experience in this field. Its product portfolio covers a wide range of highly effective sputtering targets and evaporations materials.

Indium Tin Oxide can be used in Evaporation Systems for depositing thin conductive transparent layers for a variety of applications such as LED, sensors, and antistatic coatings. The desired combination of electrical conductivity and optical properties is achieved by varying In/Sn mixing ratio and process conditions.



Selection of ITO Products for Evaporation

Indium Tin Oxide (ITO) for Evaporation

Production Process

Our ITO evaporation materials are produced from engineered powders by state-of-the-art blending and consolidation techniques. This ensures well defined physical properties and uniformity within the product. The products are designed to be applicable in E-beam and thermal evaporation.

Composition

Typical composition ratios In/Sn are 95/5, 90/10, 83/7 wt%; other compositions upon request.

Purity

99.99% (4N), or as indicated on product specifications.

Dimensions

Tablets and granulates are available on selected compositions and purities.

A commonly used tablet size is Ø 25 x 10 mm; other dimensions upon request.

Material Properties

- › Chemical formula: In-Sn-oxide
- › Relative density: low density grade: typical 55 – 70%
high density grade: > 99%
- › Theoretical density: 7.14 g/cm³ (90/10 wt%)
- › Appearance: yellowish green (low density) to bluish black (high density)
- › Melting point: 1730 °C

The colour appearance changes from green to black with increasing density. Also it does change from green to black when losing oxygen, e.g. after thermal exposure in vacuum.

Evaporation Characteristics

ITO fully sublimates. ITO is deposited by reactive or non-reactive electron beam (e-beam) evaporation using Cu-crucibles with Mo-liners (e.g. fitting the tablet size) as well as thermal evaporation using Mo-boats with cover.

The refractory index of ITO films, the degree of transmittance in the visible spectral range, the on-set of metallic-like reflectance in the IR spectral range and the electrical conductivity can be tuned using the composition of the starting material and/or the deposition parameters like substrate temperature, oxygen pressure, and ion assistance.

To obtain the required low absorption for ITO in coatings on plastics it is possible to use either a very small layer thickness or ion assistance with an O₂ flow through the ion source. A typical optical transmittance/reflectance spectrum is shown in Fig. 1.

As an example, typical e-beam data for a tablet size of Ø 25 x 10 mm and fully defocused e-beam are 70 – 80 mA at 6 kV to reach a deposition rate of approx. 0.8 nm/s at a distance of approx. 70 cm.

Recycling Service

Umicore Thin Film Products offers recycling programs as an added service. Umicore is your preferred partner for a closed recycling loop.

Quality Assurance

Our quality assurance process is ISO 9001:2000 certified to guarantee the highest and most consistent product reliability. Documentation, traceability, statistical process control, detailed test and process specifications as well as sophisticated analytical methods and continuously trained employees are key elements of our quality assurance process.

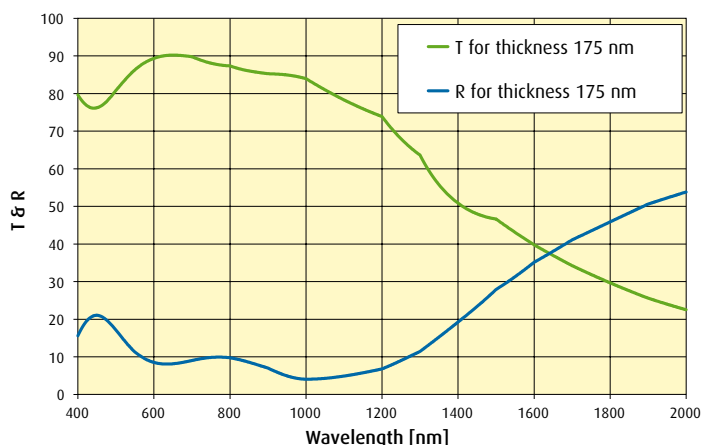


Fig. 1: Typical transmittance and reflectance spectrum for ITO

Please find your local sales partner at:
www.tfp.unicore.com

Umicore Thin Film Products AG
Headquarter
Alte Landstrasse 8
9496 Balzers
Principality of Liechtenstein
Tel +423 388 7300
Fax +423 388 7450
sales.materials@unicore.com

Umicore Optical Materials
USA Inc.
2976 S. 614 Road
Quapaw, OK 74363
USA
Tel +1 918 673 1650
Fax +1 918 673 2121
sales.materials.us@unicore.com

Umicore Thin Film Products
Taiwan Co., Ltd.
No. 22, Aly. 4, Ln. 711 Bo'ai St.,
Zhubei City, Hsinchu County 302
Taiwan
Tel +886 3553 2999
Fax +8863553 2525
sales.materals.hc@unicore.com

Due to our continuing program of product improvements, specifications are subjected to change without notice.