

PRODUCT DATA SHEET

Indium Tin Oxide (ITO)

In₂O₃: SnO₂

Introduction

Indium Tin Oxide (ITO), or tin-doped indium oxide) is a mixture of indium(III) oxide (In₂O₃) and tin(IV) oxide (SnO₂), typically 90% In₂O₃, 10% SnO₂ by weight. In powder form it is yellow-green in color but it is transparent and colorless when deposited as a thin film at thicknesses of 1000-3000 angstroms. When deposited as a thin film on glass or clear plastic it functions as a transparent electrical conductor.

ITO is normally deposited by a physical vapor deposition process such as D.C. magnetron sputtering or electron beam deposition. Less frequently, **ITO** can be incorporated in inks using an appropriate film-forming polymer resin and solvent system, and deposited by screen printing albeit with lower transparency and conductivity compared to a physical deposition process. Of the various transparent conductive oxides (TCOs), **ITO** is considered the premium TCO, having superior conductivity and transparency, stability, and ease of patterning to form transparent circuitry.

ITO is used in LCD, plasma, EL, electrochromatic and OLED displays, touch panels, antistatic coatings, EMI shielding, aircraft windshields and freezer-case glass for demisting, and photovoltaic solar cells. A lesser use is as an infrared-reflecting coating to reflect heat energy such as in low-E glass and in low pressure sodium lamps.

Indium Corporation uses a proprietary process to manufacture co-precipitated ITO powder of high purity. This process achieves tin doping at customer specified levels through actual substitution of tin in the indium oxide crystal lattice.

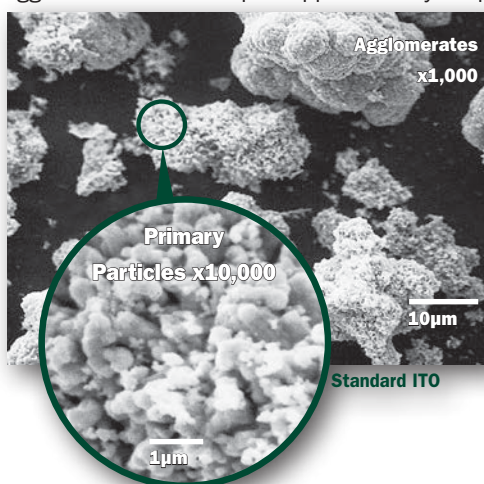
Our experience in process engineering enables us to manufacture **ITO** powder with a close tolerance particle size distribution, tap density, and BET properties. This enables our customers to manufacture high quality, high density **ITO** sputtering targets and electron beam deposition sources.

Powder Description

The powder morphology or grain structure of **ITO** varies slightly with the level of tin-doping. The morphology represented in this product data sheet is typical for a 10.0 weight percent SnO₂ equivalent doping level.

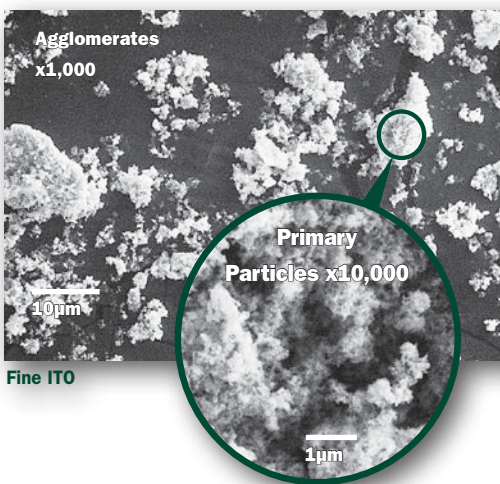
Standard ITO

- Primary particles are regularly shaped ranging in size from 0.4 to 1.0 µm
- Agglomerates in size up to approximately 31 µm



Fine ITO

- Primary particles are regularly shaped ranging in size from 0.1 to 1.0 µm
- Agglomerates in size up to approximately 7 µm



OVER→

Form No. 97550 (A4) R11

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Indium Tin Oxide (ITO) $\text{In}_2\text{O}_3:\text{SnO}_2$

Physical Property Analysis

Powder Attributes of Indium-Tin Oxide				
Product Type	Approximate PSD Microns*			BET m ² /g (typical)
	d90	d50	d10	
Type A - standard - 99.99% ITO	32.0 - 44.0	13.2 - 24.0	2.7 - 8.0	2.4
Type D - very fine - 99.99% ITO	4.3 - 11.5	1.1 - 3.0	0.4 - 0.8	18.5

* Light Scattering Analysis

Product Characteristics

Color	Greenish Yellow
Specific Gravity	7.2 g/cc (Apparent Density 0.5 - 1.2 g/cc)

Standard Packaging

Quantity	Container**
Up to 1 kg	1.4 liter (3 pint) plastic wide mouth jar
1 - 10 kg	3.8 liter (1 gallon) plastic wide mouth jar
10 - 20 kg	18.9 liter (5 gallon) plastic pail
20 - 30 kg	18.9 - 30.3 liter (5 - 8 gallon) plastic drum
>30 kg	60.6 liter (16 gallon) plastic or steel drum

**Packaging in other sizes or glass may be available upon request.

All information is for reference only. Not to be used as incoming product specifications.

Storage and Shelf Life

Indium Tin Oxide should be stored at room temperature and the container kept tightly sealed. Indium Tin Oxide has a shelf life of 12 months.

Safety Data Sheets

The SDS for this product can be found online at <http://www.indium.com/sds>

Indium Corporation is the leading global supplier of bulk indium, high purity indium, indium fabrications, alloys, and compounds. Indium tin oxide is produced in high volume utilizing state-of-the-art-SPC controlled chemical processing equipment. This, coupled with rigorous quality standards and advanced analytical instrumentation such as ICPMS, ensures consistent product quality.

This product data sheet is provided for general information only. It is not intended, and shall not be construed, to warrant or guarantee the performance of the products described which are sold subject exclusively to written warranties and limitations thereon included in product packaging and invoices. All Indium Corporation's products and solutions are designed to be commercially available unless specifically stated otherwise.

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