

Webinar Tutorial Program

Convenient, Relevant, Interactive, and Affordable Education Opportunities

The SVC Webinar Program is a convenient approach to education, featuring SVC's most popular tutorials, covering topics relevant to technical staff and operators. These Webinars are presented by recognized professionals in the vacuum coating community and allow participants the ability to interact with the instructor during the live presentation. SVC offers both Live and On-Demand (recorded) versions of webinars.

W-337

<http://www.svc.org/Education/Webinars.cfm>

Introduction to Transparent Conductive Oxides

W-337: The focus of this course is indium tin oxide, ITO, but other TCOs will be discussed. This course is intended for scientists, engineers, technicians, and others, interested in understanding the fundamentals, materials, deposition, manufacturing, properties and applications of TCOs. The performance expectations for TCOs, both from theory and experiments will be described. The fundamentals of conductivity and optical properties in TCOs will also be explained. Understanding these properties allows engineering of TCO electrical/optical (E/O) properties. Examples of design and engineering of TCO properties for specific practical applications will be presented. A methodology for TCO deposition, which develops a relationship ("Resistivity Well") for the process control of E/O properties, will be shared. Post-deposition processing will also be briefly discussed. A brief summary of E/O properties of some alternative TCOs will also be presented. Some basic knowledge of thin films and vacuum deposition is assumed, although not required.

- TCO performance expectations in theory and experiment
- Typical ITO properties in glass and plastics (A baseline for alternatives)
- Fundamentals of conductivity in TCO
- Doping and control of properties
- Deposition methodology for TCO based on process control of E/O properties
- Engineering TCOs for applications
- Alternative TCOs and other E/O properties

Meet the Instructor

Clark Bright was a Senior Staff Scientist and Group Technical Leader with 3M Corporate Research Laboratory. He retired in December 2012 and established a consulting practice - Bright Thin Film Solutions, LLC. At 3M he developed roll coated, vacuum deposited multilayer organic and inorganic thin film products for optical, transparent conductive, and barrier applications. Previously, he was Vice President at Presstek, Inc., and Delta V Technology subsidiary, and Director of Product Development at Southwall Technologies, where he led teams developing various coating technologies. He has published numerous papers and authored book chapters on optical coatings. He also holds 31 U.S. patents and many foreign patents in the field.

