

Tuesday, May 25

09.00	Tutorial Sputtering technologies for roll-to-roll coaters	Dr. Matthias Fahland
Sputtering is a versatile technology. Numerous metals and compound layers can be deposited on different types of flexible substrates. The technology is well suited for a precise deposition with respect to both uniformity and tuning of layer properties. It has been used in roll coating systems for many decades, preferably for the deposition of multilayer stacks. This tutorial will provide general information about sputter technology. It will also give an insight into the special requirements linked to roll-to-roll coating processes. This includes dealing with outgassing phenomena, managing the heat load during the deposition and special requirements of flexible substrates. Finally, the main applications are covered. These of transparent conductors or permeation barriers. Special emphasis is put on different types of radiation control coatings like low-e-, solar control coatings or coatings with variable optical properties.		
	Tutorial Ultra-thin-glass; mechanical reliability, panel level packaging	Dr. Wiebke Langgemach
Ultra-thin glass with thicknesses of $\leq 100 \mu\text{m}$ is a promising substrate in electronic, optical and semiconductor applications. Due to its low thickness and its brittleness, it requires dedicated handling to allow reliable process chains. This tutorial will provide general information about the manufacturing processes and the ultra-thin glass products. It will moreover give an insight into handling and functionalization of ultra-thin glass and into its characterization with a special focus on mechanical characterization. The last part will give an overview over applications on the market, including panel level packaging, and approaches in R&D concerning large-area sheet-to-sheet as well as roll-to-roll coating of ultra-thin glass.		
	Tutorial Applications of electron beam technology	Dr. Stefan Saager
The usage of electron beams is well known from cathode ray tubes and electron microscopy. Beyond this, they are important in the manufacturing process to produce e. g. layers in vacuum by evaporation and high-purity materials by melting. Electron beam technology also provides solutions for e.g. welding, thermal microprocessing and electron beam lithography at both vacuum and atmospheric pressure. Current developments from all over the world are presented. The tutorial describes new technologies that are characterized by high productivity, low specific energy expenditure, improved economy of materials, and improved environmental design. Fundamental aspects, process characteristics and limitations, information on plant equipment and actual application are covered.		
	Tutorial Web charging in roll-to-roll electron beam evaporation on polymer films	Bastian Zeis
Electron beam evaporation is a well-established deposition technique capable of delivering high-purity thin films at deposition rates ranging from several nanometres to multiple micrometres per second. This enables the large-area coating of polymer films at industrial web speeds, making it particularly attractive for applications requiring conductive, optical, and barrier layers on flexible substrates, where both layer quality and productivity are critical. The tutorial will present the effects responsible for web charging and discharging in electron beam evaporation insulating layers on polymer films. To provide a better understanding of how electron beam parameters and web speed impact the emergence of discharges during the process, measurement methodologies and results that have been achieved on an industrial scale roll-to-roll electron beam evaporation plant to facilitate the evaluation and potential regulation of these charging phenomena are discussed.		