

ILMetro – in-line metrology station for CdTe based thin-film PV

LayTec proudly announces the shipment of two ILMetro in-line metrology stations to our Chinese customer CTIEC. CTIEC establishes a thin-film PV production line in Chengdu (PR China) based on a technology developed by its German subsidiary CTIEC / CTF Solar. The two 24/7 ILMetro in-line metrology stations are fully integrated into the fab's manufacturing line and MES system (Fig.1). Station #1 ensures 100% quality control of the incoming TCO coated solar glass substrates. It hosts a Suragus EddyCus in-line sheet-resistant unit and a LayTec Flames spectroscopic multi-head reflectance and transmittance system. Combining Eddy-Current and spectral-optical methods provides full and automated SPC of all key performance parameters of the TCO glass. The measured SPC data of station #1 are forwarded both to the fab's MES system and

to station #2. ILMetro station #2 combines a LayTec Flames with a LayTec SolR[®] metrology system. Multiple optical heads are detecting IR and vis-NIR spectral reflectance from the front side and from the back side of the CdTe thin-film PV modules. The resulting thickness uniformity of the CdTe absorber layers and of the very thin CdS buffer layers again are permanently reported with high accuracy to the fab's MES system. LayTec's ILMetro in-line metrology stations meet the IP54 and CE standards and are equipped with the necessary multiple interfaces for communication with the conveyor systems, third-party visual inspection systems as well as the fab's MES and LAN automation system. Remote service and software maintenance is provided through firewalled LAN/www.

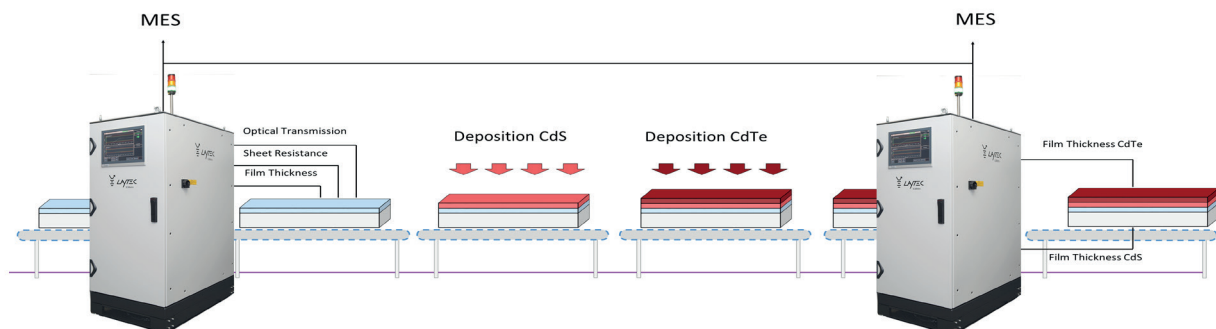


Fig. 1: Two ILMetro in-line metrology stations fully integrated into the CdTe PV manufacturing line of CTIEC.

In-line metrology for ARC coating on structured PV glass

In Q2/2017 LayTec received a major order from a glass manufacturer in Europe. The multi-head LayTec Flames in-line metrology system is equipped with newly developed analysis algorithms for SPC of the sol-gel AR coating on structured PV glasses. Despite the challenging task of measuring on the 3D micro-patterned surface of the glasses, the thickness uniformity of the AR coating is detected by the multiple-head system with nanometer accuracy in robust 24/7 operation. Both porosity and film thickness of the ARC is determined for feed-forward control through the customers MES system. Fig. 2a gives a sketch of the glass surface and Fig. 2b is an example analysis where the measured spectral reflectance (blue line) is nicely fitted by the model fitting curve (red line). The measured effective porosity and optical thickness serve as SPC control parameters for the manufacturing line.

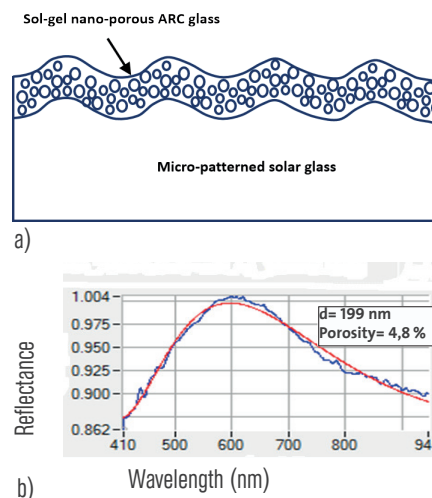


Fig. 2: PV glass application
a) Sol-gel coated nano-porous ARC glass on micro-patterned surface
b) The in-line metrology system automatically determines the porosity and the film thickness of the ARC layer by multi-head detection of spectral reflectance in a 24/7 production line.

You can meet us at the following workshops, conferences and trade fairs:

24–26 October 2017 | [Workshop V2017](#) | Dresden, Germany
24–25 October 2017 | [PV Days 2017](#) | Halle (Saale), Germany