

Real-time thin film quality control in Roll-to-roll production processes

The compact measurement technology allows inline quality control of thin film coatings in roll-to-roll processes. Homogeneity and two-dimensional layer thickness distribution can be measured in real-time, thus allowing to ensure product quality, immediately correct process parameters if required and optimize material consumption. The robust and energy-efficient process is based on ellipsometry and can be applied for transparent and semi-transparent coating materials on flexible, transparent and birefringent surfaces.

REFERENCE:

M017/16

APPLICATIONS:

- Flexible thin film solar cells,
- Organic photovoltaics,
- Flexible LED/OLED lighting and display technologies,
- Medical technologies, Semiconductor industry,
- Microsystems technology,
- RFID

DEVELOPMENT STATUS:

TRL 4

KEYWORDS:

Roll-to-roll; thin film; quality control; layer thickness; in-line; ellipsometry; printed electronics

IPR:

Patent application filed

OPTIONS:

R&D co-operation
License agreement

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BACKGROUND

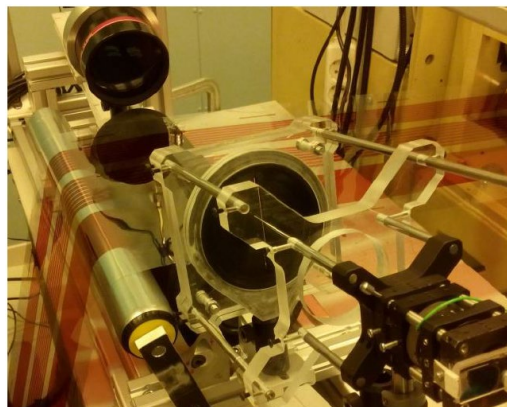
Roll-to-roll processes enable cost-efficient production of printed electronics, photovoltaics or other thin films on flexible substances like plastic or metal foils and flexible glass. Quality control of homogeneity and layer thickness is often conducted on the final product only.

The aim of the development was therefore to provide a cost-efficient solution to observe the coating process in real-time.

TECHNOLOGY

The measurement is carried out based on ellipsometry, i.e. on capturing the samples polarizing characteristics on incident light. The technology is optimized for application to cylindrical substrates like foils on guide rolls in R2R-production and can be used for quality control of layers within a thickness range of 10-500nm.

The proposed setup can easily be installed in a R2R-line. The direct measurement on a roll allows a very stable measurement and avoids problems with the waviness of the foil and with foil vibrations. Due to the movement of the foil the complete thickness distribution of the coating can be acquired.



ADVANTAGES

- Real-time measurement
- Applicable for layer thickness of 10 nm up to 500 nm
- Compact and energy efficient
- Suitable for production environment (robust)
- Allows inline process control and adjustment