

Hyperspectral Imaging for in-line thin film characterization in large area roll to roll processing

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Large area roll-to-roll (R2R) thin film coating processes of flexible substrates are established as a cost efficient means of production of organic electronics. Even small variations in layer homogeneity in terms of thickness and composition may lead to large changes in final product properties. Due to the high throughput of coated surface area in R2R coating ex-situ material characterization after coating is time consuming, often destructive and offers no possibility to influence the running coating process.

The purpose of this paper is to present a powerful method where in-line hyperspectral imaging (HSI) is combined with X-ray reflectometry (XRR) via a machine learning algorithm to enable in-line process monitoring. The high web speed of several m/min, total web length of several hundred meters and web width up to 600mm represent a major challenge for in-line HSI data acquisition, handling and analysis.

Latest developments of combined HSI-XRR towards large area & real-time in-line R2R quality control and process monitoring will be discussed.

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