

Workshop »Digital Data creates value – recognising and exploiting opportunities«

Digitalization of in-situ process data – selection and pre-processing of sensor data

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Successful digitalization of deposition processes requires real-time data from a variety of sensors. All data must be collected and saved in a single database to allow common processing, evaluation and visualization. Especially in-situ data are often rather extensive and complex such as data from spectroscopic plasma monitoring, frequency spectra from electrical probes or broadband photometric data of the coated surface. Data transfer time as well as data base space usually limit the amount of data which can be transferred from the sensor to the database in 24/7 production environments. These limits together with proprietary data formats are among the current main barriers to the digitalization of production processes.

Smart and automated in-situ sensors are one solution to overcome these barriers as they are able to pre-process the large amount of acquired data according to configurable algorithms and evaluation rules in real-time. This results in a manageable set of in-situ parameters which should reflect all main and important in-situ process and product properties and allows its transfer to the database. Thus, real-time evaluation significantly reduces the amount of data without losing the relevant process information.

In this talk the idea of a smart sensor is demonstrated at examples of combined in-situ and in-line plasma monitoring, electrical and photometric real-time data acquisition and processing in demanding sputtering, HIPIMS, PECVD and microwave coating processes, including applications in tribological, photovoltaic and architectural glass coating. By combining information from different sensors in a single system in real-time the accuracy of the process monitoring is increased, which in turn enhances production stability and results in improved product quality.