

Process spectroscopy

Process spectroscopy has been firmly established in the industrial environment for many decades. The resulting spectral data is subject to automated evaluation procedures/methods. These automated methods monitor the process, the medium or the product. They control the spectrometer, record the spectra, evaluate the spectra and provide the operator or process monitor with feedback on the status. For process spectroscopy, it is essential to know the samples, possible interferences and the definition of process limits within which the measured values/measured parameters may be located. Multivariate statistical methods (chemometrics, machine learning algorithms) are used to reliably and quickly provide the desired data or parameters from the recorded spectra.

The evaluation procedures and methods must be validated for the respective process in order to ensure a reliable result.¹¹ Spectral data from process spectroscopy is pre-processed according to the requirements of the result (referencing, smoothing, baseline correction, normalization, etc.). Process parameters can then be determined using chemometric methods. The originally measured raw data is often not retained in process spectroscopy due to its scope, but only the result is documented or saved.

References

¹¹ For validated measurement methods, proof must be provided that they work reliably under defined conditions and that the measurement results can be obtained repeatedly. Characteristics such as precision, accuracy, detection limit, limit of quantification, selectivity, specificity, value range, linearity and robustness must also be defined for the measurement results.

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