

Automated Multi-sample Moisture Sorption Analysis

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A new multisample instrument for accelerated studies of moisture sorption or desorption of drug substances, food products, fine chemicals and materials is introduced [1]. Many completely different parameters and conditions are of a crucial influence for the outcome of moisture sorption investigations. One of the most important advantages of automated devices in comparison with classical approaches (determination of the moisture sorption data in a chamber with a salt solution) is the continuous acquisition of the mass change of the sample (in-process procedure). From such measurements we may derive basic physicochemical parameters of a substance, detect reactions caused by moisture interactions (crystallization, phase transitions, deliquescence, chemical degradation etc.) and study the kinetics of such reactions. In continuously recording the change of the sample mass at controlled temperature and relative humidity conditions the kinetics and extent of a sorption/desorption process is recorded mostly until an equilibrium is obtained. From these data the equilibrium moisture sorption/desorption isotherm can be plotted which may provide important informations for rational based and successful development of a product including the evaluation of suitable storage conditions [2].

The basic features of the here presented devices, namely the Sorption Test System SPS11 with the two models SPS11-10 μ and the SPS-100n, will be outlined and discussed. The main characteristics the instrument with the lower balance sensitivity (10 μ g) are a large sample pan, allowing the investigation of samples with a size of up to 50 mm and a thickness of several mm. The device with the sensitivity of 100 nanograms uses smaller pans of 18 mm diameter and can deal with sample amounts of about 1 to 100 mg. The devices work with high precision and due to a special compensation feature the reproducibility of the measurements is extremely good. Due to the multi-sample assembly it is also possible to use an internal standard (in-process calibration) in addition to the investigated samples, for the achievement of highest accuracies. The calibration of the moisture sensors is usually performed with appropriate saturated salt solutions. Further features of the instrument and its usefulness in high throughput screening programs (salt screening, polymorph screening) or raw material testing are outlined in this presentation.

References

- 1 Griesser, U.J., Dillenz J., Proceedings, Weimarer Feuchtetagung (2002)
- 2 Marti, E.E., Griesser, U.J., Dillenz, J., Extended Abstract, Int. Symposium on Food Rheology and Structure, ETH Zürich, February (2006)