



Water Sorption Analysis

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DVS Intrinsic

The DVS intrinsic is an economical research grade water sorption instrument. It is easy to use and provides fast high quality isotherms with minimal operator training. It's compact, small footprint requires very little bench space.

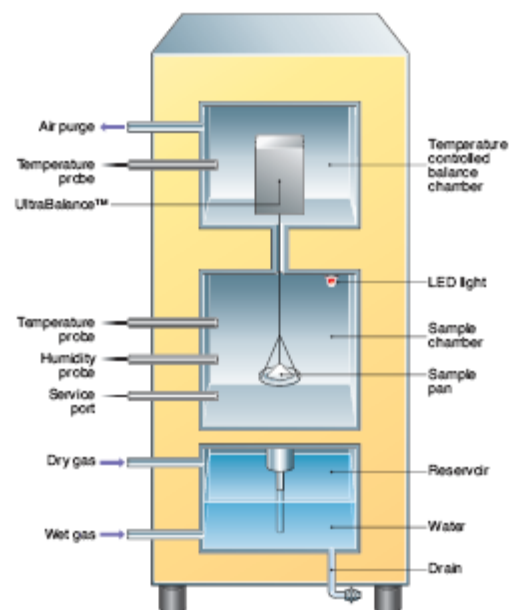
The DVS Intrinsic measures the uptake and loss of moisture by flowing a carrier gas at a specified relative humidity (RH) over a sample suspended from an ultra-microbalance. The sorption/desorption of water vapor is measured by the increase/decrease in the mass of the material. Sorption behaviour can be accurately determined on very small samples (1-20 mg) thus providing great savings in the time required to reach water sorption equilibrium. The system can perform isoactivity measurements in which materials are kept under constant RH conditions while linearly or stepwise varying the temperature.

The DVS-WIN software package provides a flexible and easy to use operator interface. Software wizards guide the user step-by-step through all operational functions. The Data Analysis Suite enables rapid isotherm plotting and quantitative data analysis. Up to five DVS Intrinsic systems may be linked to a single PC.

The water sorption properties of solid materials have traditionally been evaluated by storing samples in sealed jars containing saturated salt solutions and then periodically weighing these until equilibrium is reached. However, the disadvantages of these manual jar methods include:

- The days/weeks taken for the samples to reach equilibrium.
- Weight loss/gain errors due to repeated removal of samples from jars.
- Large samples needed (10-100g) to compensate for balance inaccuracies.
- Inability to measure the kinetics of water sorption/desorption
- Risk of mould formation
- Highly labour intensive

In contrast the DVS Intrinsic offers an extremely rapid, highly sensitive and accurate means for the determination of moisture sorption properties of solids.



Schematic of the main components of the DVS Intrinsic

The DVS Intrinsic from **Surface Measurement Systems** features:

- Accurate water sorption measurements with +/- 0.1µg resolution
- An extremely stable baseline, with temperature stability +/- 0.1°C.
- Precise Relative humidity +/- 1% RH, verified by humidity and temperature probes.
- A wide variety of sample sizes up to 4 gram and as large as 40mm.
- Compact design using minimal bench space – only 26cm wide

Materials studied

Pharmaceuticals

powders, tablets, API's and excipients

Food

powders, processed food, biscuits

Natural materials

grains/seed, wood

Building materials

aggregates, cement, ceramics

Personal care

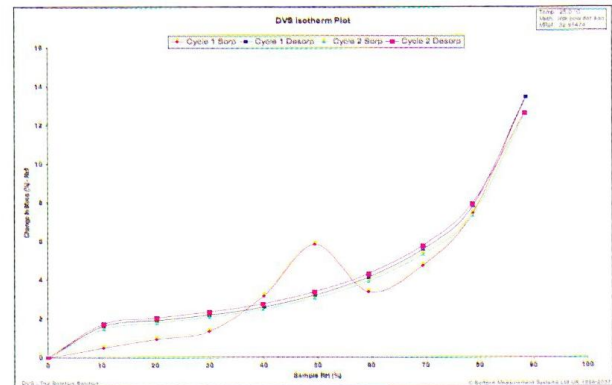
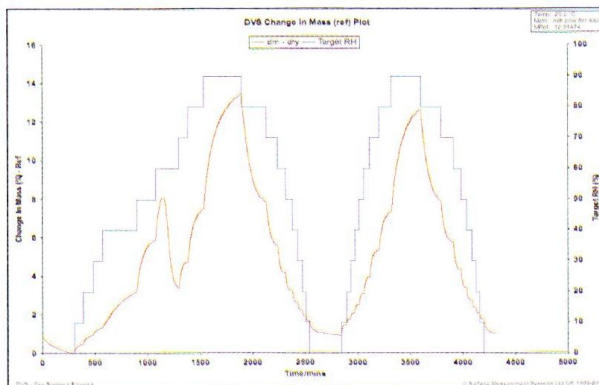
cosmetics, hair care, contact lenses

Packaging materials

paper, plastics

Applications

- Hygroscopicity of powders, fibres and solids
- Kinetics of water sorption and desorption
- Water induced morphology changes
- Food shelf-life prediction studies
- Effects of moisture on texture



Milk powder, two cycles, showing amorphous recrystallisation