

Accessories

Camera, Raman Spectroscopy, Membrane Dryer and Permeability Kits





SPS Accessories: Camera

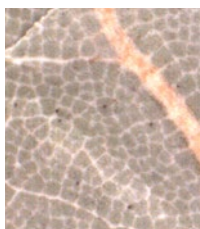
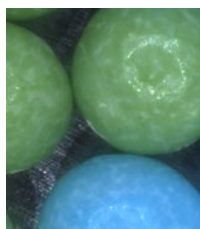
The camera option for the SPS instruments enables the documentation of visual changes of samples during a sorption measurement.

- Color changes
- Sintering and viscous flow
- Structural changes (e. g. cracks)
- Swelling and deformation
- Liquefaction and solidification

Image acquisition is triggered via the SPS software and synchronized with the auto sampler. Images are allocated to the sorption data of the samples.

Technical data

Sensor type	CMOS
Sensor size	11.3 mm x 11.3 mm
Resolution	2046 x 2046 pixel
Pixel size	5.5 μm x 5.5 μm
Camera lenses	35 mm for sample dishes \varnothing 50 mm 50 mm for sample dishes \varnothing 33 mm
Camera adaptor set	for the adaption of the 35 mm and 50 mm lenses
Lense mount	C-Mount
Camera mount	with anti-condense heating
LED ring light	fully automated, integrated into the camera mount
Interface	Gigabit Ethernet
Data format	PNG images
Software	extension of the SPS software with the following functions: <ul style="list-style-type: none">- synchronisation of the camera with the sample changer- image acquisition according to selectable criteria (timer, counter, equilibrium)- allocation of image data to sorption data- optional image labelling with sorption data- Excel report with hyperlinks to the corresponding image files
Compatibility	the imaging system is available for the following SPS instruments: SPS11-10 μ , SPSx-1 μ -High-Load, SPSx-1 μ -Advance





SPS Accessories: Raman Spectroscopy

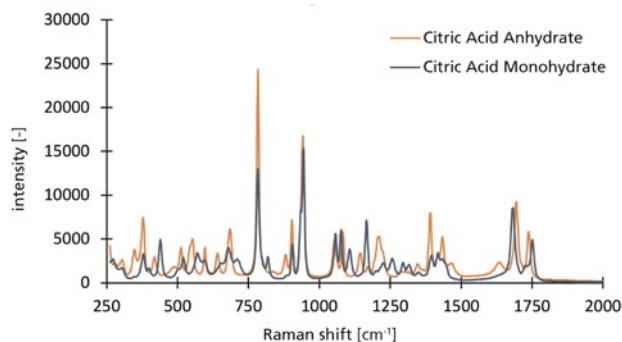
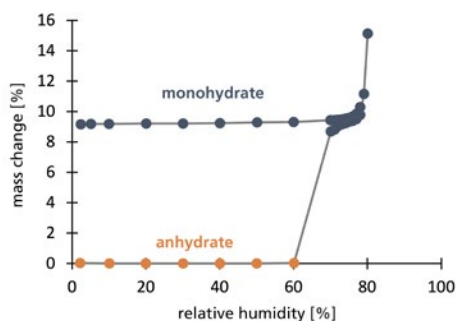
Sensor fusion combining water vapour sorption and Raman spectroscopy opens new and exciting perspectives for the analysis of solid materials.

Control of the Raman spectrometer via the SPS software enables the automated recording of Raman spectra during a running sorption measurement.

The DVS-Raman spectroscopy combination is a powerful tool to monitor moisture induced phase transitions such as hydrate formation and crystallisation of amorphous materials.

Technical data

Manufacturer, model	Wasatch Photonics WP 785
Spectral range	270 ... 2000 cm^{-1}
Resolution	7 cm^{-1}
Detector TEC set point	10 \pm 0,2 $^{\circ}$
Integration time	3 ms ... 60 s
Laser	785 nm, multimode
Laser power	up to 450 mW, adjustable by the software
Working distance	50 mm (variable)
Dimensions & weight	width 16.5 cm, depth 16.2 cm, height 8.2 cm, weight 2.2 kg
Environmental conditions	0 $^{\circ}\text{C}$ to 40 $^{\circ}\text{C}$, non condensing
Software	<ul style="list-style-type: none">– Synchronisation of the SPS with the Raman spectrometer– User defined event triggered recording of Raman spectra (e. g. equilibrium conditions, time interval)– Display of Raman spectra within the SPS software
Compatibility	SPS11-10 μ , SPSx-1 μ -High-Load, SPSx-1 μ -Advance



Sorption isotherm of citric acid measured at 25 $^{\circ}\text{C}$ and Raman spectra of the anhydrate and monohydrate form.

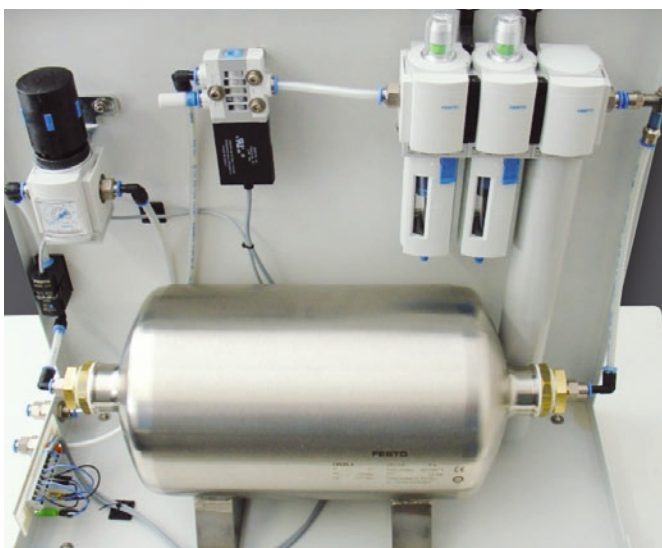


SPS/Vsorp Accessories: Membrane Dryer

The membrane dryer is installed between the SPS/Vsorp instrument and the local compressed air network in case the requirements for sufficiently dry air are not fulfilled. The entering air is filtered, dried and stored in a pressure tank. The membrane dryer meets the requirements of the SPS/Vsorp instruments for a pulse-resistant compressed air supply.

Technical data

Gas supply	compressed air, clean, oil-free (class 2, ISO 8573-1:2010)
Input pressure	5 bar to 10 bar
Output pressure	4 bar
Buffer storage capacity	5 litres
Nominal gas flow rate	10 l/min
Drying capacity	dew point reduction of 40 K
Dimensions	width 475 mm (without connections) depth 181 mm height 415 mm
Weight	12.6 kg
Environmental conditions	+15 °C to +25 °C, max 75 % RH
Power supply	+24 V DC, 0.5 A
Connections	input compressed air: push-lock connector 6 mm output dry air: push-lock connector 6 mm DC power input: 2.5 mm





SPS/Vsorp Accessories: Permeability Kits for 5 or 11 samples

Gravimetric determination of the water vapour permeability of a foil/film with the SPS and Vsorp instruments.

The Permeability Kit works according to the EN ISO 7783-1 part 1: "Dish method for free films".

The amount of water vapour transmitted through a foil/film with a given surface area and given difference in partial water vapour pressure is determined by frequent weighing over a specified period of time.

Technical data

Number of samples	5 samples/11 samples
Surface area	3500 mm ² /2273 mm ² per sample
Smallest detectable transmission rate	0.05 g/(m ² day)
Accuracy	within smallest detectable transmission rate
Max foil thickness	ca. 1 mm (depending on material properties)
Dimensions of sample dish	outside diameter 80 mm/67 mm inside diameter 66.8 mm/53.8 mm height 22 mm/23 mm
Content of the Permeability Kit	sample tray for 6/12 sample positions 5/11 coated sample dishes 1 reference drying agent: molecular sieve 3 Å, 1.6-2.5 mm, 250 g toolkit: scalpel, PTFE paste for metallic foils
Compatibility	the Permeability Kits can be used with the following DVS instruments: SPS11-10μ, SPSx-1μ-High-Load Vsorp Basic, Plus and Enhanced



Permeability Kit 5



Permeability Kit 11



SPS/Vsorp Accessories: Permeability Kit – Inverted Wet Cup

Gravimetric determination of the vapour permeability of foil/films with the SPS and Vsorp instruments.

Inverted Wet Cup Method

Sample dishes filled with water or another liquid are placed upside down on the sample tray. The sample are in direct contact with the liquid.

The amount of vapour that diffuses through the sample film and the resulting weight changes of the dish are determined by continuous weighing (at a defined relative humidity and temperature)

Technical data

Number of samples	5 samples
Surface area	1507 mm ² per sample
Smallest detectable transmission rate	0.01 g/(m ² day)
Accuracy	within smallest detectable transmission rate
Max foil thickness	ca. 1 mm (depending on material properties)
Dimensions of sample dish	outside diameter 60 mm inside diameter 43.8 mm height 10 mm
Content of the Permeability Kit	sample tray for 6 sample positions 5 coated samples dishes 1 coated reference 6 coated drip dishes toolkit: scalpel, PTFE paste
Compatibility	the Inverted Wet Cup Permeability Kit can be used with the following DVS instruments: SPS11-10 μ , SPSx-1 μ -High-Load Vsorp Basic, Plus and Enhanced





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