



Inas® – New spectrometer for the measurement of pharmaceutical aerosols



► With the Inas® aerosol spectrometer system Palas® offers a new solution for the characterisation of pharmaceutical dosing and dispersing systems. Inas® allows the simultaneous measurement of particle size and particle quantity and a real-time evaluation.

► Page 2



Dear Readers,

► Palas® measures now „from micro to nano“: With two new devices, the condensation nucleus counter system Nanoco® and the electrometer Charme®, we got now also in the range of the nano-measuring technology. Thus we can offer also solutions for highly sensitive measurements of particle sizes starting from 2 nm, for example with emission and immission measurements within the range of the health protection. For many years, generators for the generation of test aerosols from nano particles have been already part of our product range.

Beyond that, with the measuring instrument Inas®, we offer a new aerosol spectrometer for the characterisation of sprays of medical nebulisers. We already reported in Palas® Particular 1/2009 on the development of the Inas® in the context of a dissertation. Now, this measuring instrument, equipped with digital single signal detection, is available as market-ready product - as result of a successful co-operation between science and practical technology development.

Leander Mölter

Managing Director of Palas® GmbH

Further topics in this issue:

► Palas® offers new measurement technology for nano particles

With new measurement technology Palas® makes now also meaningful particle measurements possible starting from 2 nm. The new devices **Nanoco®** and **Charme®** are characterised by a high time resolution. ► Page 2

► New products and optimised solutions

- DNP 3000** – Soot generator for the calibration of exhaust test rigs
- BEG 2000/3000 Dosing and dispersing system** – First remote-controlled aerosol generator with automated mass flow control and automated refill unit
- welas® digital 3000** – More compact due to new optical fibre technology
- Fidas® mobile** – Fine dust monitor system as hand-held unit ► Page 3

► Successful Filtech 2009

The live demonstration of one MFP 3000 filter test stand during the Filtech exhibition in Wiesbaden, Germany in October 2009 convinced an Indian filter technology company of the advantages of the Palas® technology. ► Page 4

► Prospective processing engineers visited Palas®

18 students of the Dual Academy (DHBW) Mosbach, Germany read up on the practical aerosol and particle technology on the Palas® premises on February 19, 2010. ► Page 4

► ATS 2010

Palas® invites experts from industry and research to participate in the 24th Aerosol Technology Seminar (ATS). The seminar will take place in Karlsruhe, Germany on October 3, 4 and 5, 2010. ► Page 4

Inas® for the characterisation of pharmaceutical aerosols

Palas® launches new aerosol spectrometer system for development, comparison and quality control of pharmaceutical dosing and dispersing systems

► With the Inas® instrument Palas® developed a new system for the measurement of highly concentrated pharmaceutical dosing aerosols. Sprays of nebulisers, dosing aerosols (MDI - "metered dose inhalers") as well as powder inhalers (DPI - "dry powder inhalers") can be tested timely highly resolved within the range from 0.2 to 40 µm. The simply manageable and low-maintenance instrument allows the **simultaneous measurement of particle size and particle quantity and a real-time evaluation**. The measurement results achieved with Inas® show, even with powder substances, a very good correlation with the gravimetric measuring methods required at present.

Development in co-operation with scientists from the University of Kiel, Germany

"The particle size distribution and the particle concentration are the crucial values with the application of medical active substances via the respiratory system", explains Leander Mölter, the managing director of Palas®. "The accurate characterisation of the used aerosols, as it is possible with Inas®, is therefore particularly important with quality control and the development of dosing and dispersing systems."

The technical basis of this new product is the



Inas® with welas® digital 2000

optical aerosol spectrometer welas® digital. Dr. Maren Kuhli from the Pharmaceutical Institute of the Christian-Albrechts-University of Kiel, Germany recently completed her dissertation which was supported by Palas®. In the context of this dissertation, the technology for the measurement of highly concentrated pharmaceutical aerosols was optimised. With a coincidence correction according to Dr. Um-

hauer and Prof. Dr. Sachweh one can now measure with the new aerosol spectrometer in substantially higher concentrations. Furthermore, the software saves the signal of each measured particle. "Each measuring signal gets a time stamp," explains Mölter, "Additionally, the length and height of the scattered light impulse are registered."

With a minimum time resolution of 10 msec even unsteady effects can be measured. A new aerosol sensor (measuring volume size 70 x 70 x 70 µm³) is combined with a new dilution system. Thus one can measure with Inas® in number concentrations of up to 10⁷ P/cm³.

Advantages over established methods

Inas® makes a highly resolved determination of pharmaceutical aerosols possible concerning their particle size with more than 100 size channels. With the simultaneous quantity determination the concentration is determined in real time. The impactors currently allowed for the characterisation of pharmaceutical aerosols divide however the particle size only in 8 - 12 stages. With an alternatively applicable Fraunhofer spectrometer a spray can be evaluated time-resolved in up to 32 size channels, but the mass concentration cannot be determined.

Palas® offers new measurement technology for nano particles

► With new measurement technology Palas® makes now also meaningful particle measurements possible starting from 2 nm. The new devices Nanoco® and Charme® are characterised by a high time resolution. For instance during the emission and immission control and the workplace monitoring in the context of health protection there is a demand for this highly sensitive measuring technology within the nano-meter range. The **condensation nucleus counter system Nanoco®** measures particles starting from 2.5 nm. Application areas are the aerosol research, test of air cleaners and filters, measurements in the atmosphere and in the working environment as well as inhalation tests.

The **mobile aerosol electrometer Charme®** - for concentration measurements within the size range of approx. 2 nm - 5 µm - achieved very good test results when being compared with already established electrome-

ters at the Federal Office for Metrology METAS in Switzerland. The characteristics of Charme® are a measured value display and an operation via touch display. The particle concentration and the electrometer flow are presented as charts.

The hand-held instrument has a network interface as well as a serial interface for data transfer and can be operated by rechargeable battery. By means of a replaceable gravimetric filter the correlation between the measured flow and the mass concentration can be determined in highly concentrated aerosols. The application areas of Charme® are the examination of concentrations in the environment and in the working environment as well as the calibration of e. g. condensation particle counters (CPC).

For many years, Palas® has been already offering also aerosol generators for the generation of test aerosols from nano particles.

Condensation nucleus counter system Nanoco®

Application fields: aerosol research, test of air cleaners and filters, measurement of particle concentration in the atmosphere and in the working environment, exhaust measurements $d_{min} = 2.5 \text{ nm}$; $d_{50} = 5.5 \text{ nm}$ (50 % counting efficiency); 100 % counting efficiency from 10 nm; $C_{Nmax} \leq 10^7 \text{ P/cm}^3$

Nanoco® 100

$C_{Nmax} \leq 20,000 \text{ P/cm}^3$ in counting mode
 $C_{Nmax} \leq 10^7 \text{ P/cm}^3$ in nephelometric mode

Nanoco® 200

$C_{Nmax} \leq 10^6 \text{ P/cm}^3$ in counting mode

Mobile electrometer Charme®

Measuring range: 0.1 fA - 22,500 fA
 (1 fA = 0.000 000 000 000 001 A)
 Size range from approx. 2 nm to 5 µm

New products and optimised solutions

On the basis of further developments of proven procedures Palas® offers new solutions for the aerosol generation and dosage. The products within the range of particle measurement technology have been further optimised and developed.

DNP 3000 – Soot generator for the calibration of exhaust test rigs



DNP 3000

▶ The DNP 3000 generates smallest carbon particles by high voltage sparks between two graphite electrodes. The developing carbon agglomerates are similar to diesel soot concerning the particle size distribution. The DNP 3000 made by Palas® is ideally suitable for the calibration of PMP exhaust measuring systems, of environmental measuring systems and of soot measuring systems, e.g. for small heating systems.

This is of special importance, since counting testing methods for diesel vehicles are prescribed Europe-wide. The DNP 3000 is equipped with a touch display and is characterised by a simple operational concept. Furthermore, a reference exhaust generating a stable volume flow of 450 l/min can be controlled with the firmware. Thus an entire exhaust test rig can be calibrated by using the **DNP 3000 with reference exhaust** instead of a car.



Nanoco®



Charme®

BEG 2000/3000 Dosing and dispersing system – First remote-controlled aerosol generator with automated mass flow control and automated refill unit



BEG 3000

▶ On the basis of the proven dust dosing and dispersing system BEG 1000 Palas® developed two new versions BEG 2000 and BEG 3000. In the new system BEG 3000 the dust dosing is continuously monitored by balances and adjusted to a certain value. The dust supply in the dosing reservoir is refilled automatically by means of a dosing channel.

An alarm signal shows in time if the dosing system runs out of dust supply. The control is done by an easily operable touch display. This one can be activated by means of a network interface and integrated in an existing company network or process control. The firmware is characterised by high user friendliness: Only the desired dust mass flow must be entered, the system carries the rest out all by itself. With the new BEG 3000 for example airplane engines can be tested on their wear behaviour during high dust load. Engines of a well-known aircraft manufacturer were already tested successfully with the Palas® system. Beyond that the system offers special advantages during loading tests of complete filters and during the drying soot dispersion.

The version BEG 2000 has all advantages of BEG 3000, it is however not equipped with a refill unit.

welas® digital 3000 – More compact due to new optical fibre technology



welas® digital 3000

▶ Up to now, the welas® digital 3000 system consisted of one control and evaluation unit, two aerosol sensors, four optical fibres and one lamp unit. Due to the introduction of a new optical fibre technology the light is now split up, at the same light power, from one source of light on two outputs. Thus the lamp unit can be designed much smaller and be directly integrated into the control and evaluation unit. The so far separate lamp unit is not required anymore.

Fidas® mobile – Fine dust monitor system as hand-held unit



Fidas® mobile

▶ The Fidas® system for dust measurement is now available also as compact hand-held unit Fidas® mobile. The aerosol sensor of Fidas® is equipped with a resistant high power light-emitting diode of 12 W as source of light. Thus it has a substantially longer lifetime than sensors with a conventional bulb. The system allows time high-resolved measurements of fine dust values (PM₁, PM_{2.5}, PM₄ and PM₁₀) in real time. The simply manageable equipment offers advantages for continuous measurements in the environment, in interior spaces and at workplaces.

Successful Filtech 2009 On-site demonstration and service of Palas® convinced prospective customer

► The live demonstration of one MFP 3000 filter test stand during the Filtech exhibition in Wiesbaden in October 2009 convinced an Indian filter technology company of the advantages of the Palas® technology. "We submitted a first quotation on site", reports sales engineer Sven Schütz. The customer placed his order already in November, after further of his requirements had been included in the Palas® quotation. Palas® provided full service during the installation of the test stand. "After a detailed training in Karlsruhe we supported the

customer via internet in setting up the necessary software on a computer in India", explains Schütz. Since January 2010 this test stand has been used for the quality control and development of filter media. And the test stand has been working smoothly – a fact of which Sven Schütz was assured by an employee of the customer company during a meeting in the context of the Filtrix exhibition in New Delhi in February 2010. On this occasion the employee gave the Palas® team credit for the competent and reliable co-operation.

Prospective processing engineers visited Palas®



► 18 students of the Dual Academy (DHBW) Mosbach, Germany read up on the practical aerosol and particle technology on the Palas® premises on February 19, 2010. Palas® had invited the group from the Department of Process Engineering to Karlsruhe-Hagsfeld. The technologies of the particle measurement and the concrete application fields were demonstrated by a paper and a guided tour of the company. The full-time excursion met with a good response from the students and the head of the excursion, Dr. Albrecht Mund, as the throughout positive feedbacks show.

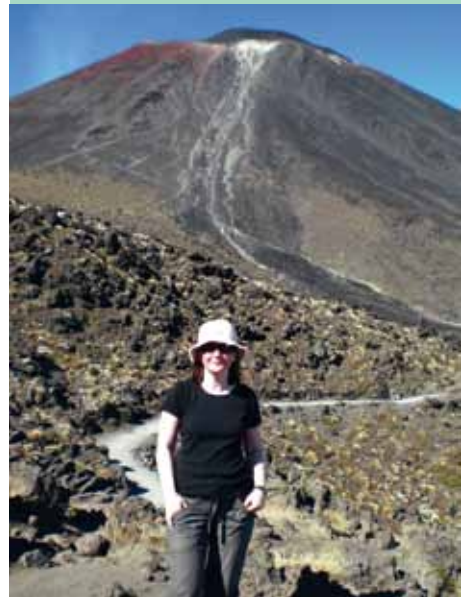
"We gained a good insight in the presented technology and were able to well relate the application to the shown examples in practice. Altogether an instructive presentation." Mario Kern

"Technically well structured and understandable paper." Tobias Maul

"A profound insight into the technology, operating modes and its applications." Benedikt Knorsch

"This excursion was the best of the entire week." M.S.

Claudia Matlak is back at Palas®



Claudia Matlak hiking the Tongariro Crossing

► After a longer stay abroad in New Zealand, Claudia Matlak returned to Palas® in her function as assistant to the Management and the Sales Department. Since March 1, 2010 she has been supporting competently the Palas® secretariat among other things in writing letters to customers, in organizing exhibitions and the Aerosol Technology Seminar as well as in preparing quotations.

Aerosol Technology Seminar 2010

► Palas® invites experts from industry and research to participate in the 24th Aerosol Technology Seminar (ATS). The seminar will take place in Karlsruhe, Germany on October 3, 4 and 5, 2010. Apart from papers and discussions on current developments in the aerosol technology, the particle measurement technology will be one main focus of this year's seminar. Papers are planned on environmental and workplace measurements, inhalational aerosols and measurements in difficult environment. Further topics are fine dust and nano particles and their influences on the filter testing.

► PALAS® AGENDA

Palas® attends regularly conferences and exhibitions. The up-to-date details can be found on our website www.palas.de/Messen/E_termine.html

Among other things we will attend **POWTECH 2010** which will take place in Nuremberg, Germany, on April 27 - 29, 2010 (www.powtech.de). Visit our **stand 109** in **hall 6!**

At the same time, **IDEA 10** will take place in the USA in Miami/FL. Here we will also be represented with a stand.

We are looking forward to meeting you!

► PALAS® CONTACT

Palas® GmbH

Greschbachstr. 3B
76229 Karlsruhe, Germany
Phone: +49 721 96213-0
Fax: +49 721 96213-33
E-Mail: mail@palas.de
www.palas.de

Editor

Nina Heim

Words and Layout

Andreas Mauritz - Public Relations

Palas® **Particular** is published half-yearly. We are looking forward to your suggestions and critical comments. Should you need further copies or should you want to recommend our newsletter, please send us an e-mail with your contact data.