onset

Thermal Analysis

March 2002

Olaf Ludewig from Schwarz BioSciences GmbH is the Winner of our Sony Digital Camera DSC-P50 at K 2001

Dr. Gudrun Steinhage and Olaf Ludewig

Out of 164 visitors who completed our questionnaire at K 2001 in Düsseldorf, the world's biggest fair for plastics and rubbers, Olaf Ludewig from Schwarz Biosciences GmbH, Monheim, is the winner of our digital camera to the value of 500 euro. The prize was handed over by Dr. Gudrun Steinhage (see photo), the representative of NETZSCH-Gerätebau GmbH for Northern Germany.

Since 1987 Mr. Ludewig has worked in the pre-clinical department at Schwarz BioSciences GmbH. His work is concentrated on the investigation of patches containing drug substances which are, for example, used for the treatment of patients who suffer from heart conditions or Parkinson's Disease. Contrary to tablets, the advantage of patches is that they release a constant dose of the drug substance to the body over a long period of time. The drug substance is contained in the adhesive.

DSC and TG are mainly employed for the characterization of raw materials. For testing of patch materials - with or without the mixture of adhesive and drug substance - DMA is used. Important points, among others, are the determination of the glass transition temperature, investigation of interactions between the adhesive and the drug substance as well as determination of the stickiness (creeping and flow behavior). The drug substance may have effects on the adhesive such as softening or cross-linking.

We hope Mr. Ludewig enjoys taking pictures with his new camera!

Special Offer for our Software Packages

Until June 30th, 2002, we offer you a discount if you want to have your thermoanalytical system upgraded from the 16-bit world (versions 2.x and 3.x of the NETZSCH Windows™ Software) to the 32-bit Proteus® world. This special price is valid for all standard instruments (TG, STA, DSC/DTA, DIL/TMA) and includes upgrade of your existing additional packages such as determination of the heat capacity, c-*DTA* or macro recorder.

Be sure not to miss this opportunity. Your sales person looks forward to discussing further details with you.

Contents

NETZSCH

NETZSCH

The Right Instruments for all Kinds of Thermal Conductivity Measurements

With the acquisition of Holometrix Micromet last fall, we greatly expanded our product line in the field of thermal conductivity measurements. Instruments are available for the measurement of insulations as well as highly conductive materials such as those used for heat sinks .

Holometrix, originally Dynatech Scientific, was founded over 30 years ago by faculty from Massachusetts Institute of Technology (MIT) and has since then become a renowned supplier of instruments for the determination of thermophysical properties - especially in the US market. The newly founded company NETZSCH Instruments Inc., headquartered in Boston, Massachusetts, combines Holometrix Micromet with the American daughter of NETZSCH-Gerätebau GmbH.

LFA 437 Microflash™

Application Ranges

Knowledge of thermophysical properties such as specific heat or thermal conductivity and thermal diffusivity has become increasingly important over the last decades. For example, to keep the energy demand in a house as minimal as possible, it is recommended to use k-insulation and building materials with a low thermal conductivity (small k-value). To optimize the heat flow in modern, highly integrated micro processors the use of materials with a high thermal conductivity is needed. For the determination of the thermal conductivity of materials, different standardized techniques and systems are now available. Each instrument is suited for solving various specific problems.

HFM 436 Lambda

Steady-State Methods

So-called heat flow meters are based on a steady-state method, where a disk or square shaped material is inserted between two plates - with a fixed temperature difference. Heat flow sensors, which are mounted on the two plates, record the linear heat flow through the sample. Typical representatives are the Lambda series instruments (see foto of HFM 436 Lambda). This system is especially suited for the investigation of materials with low thermal conductivity values (between 0.005 and 0.5 W/mK). Samples with a height up to 10 cm and a length or diameter of 30 to 60 cm can be used. For smaller dimensions and higher thermal conductivities, guarded heat flow meters can be employed.

So-called guarded hot plates are based on a similar principle. In these systems, the heat source is located in the center between two samples with the cold plates lying outside. Electrical power applied to the main heater creates a temperature

gradient in both samples. One or serveral guards around the sample and the hot plate, respectively, guarantee a one-dimensional heat flow. Instruments of this kind have somewhat higher temperature and thermal conductivity ranges compared to the heat flow meters described before. With guarded hot plate systems, materials up to approximately 2 W/mk in the temperature range from -180 to 650°C can be tested.

Transient Measuring Methods

For analysis of materials with high thermal conductivities, dynamic measuring methods have been established, featuring, among other things, easy sample preparation and the possibility of working to higher temperatures.

Concerning the hot-wire method, a heatable wire is embedded in a sample. By putting in a constant power in the hot wire, the temperature increase at the hot wire or in a sensor parallel to it, is detected versus time. From the temperature rise, the thermal conductivity of the surrounding samples can then be determined.

Another technique is the laser flash method, where the thermal diffusivity of a sample is measured. If the specific heat and density of a material are known, it is possible to calculate the thermal conductivity. The specific heat as a function of temperature can be determined with a laser flash measurement by means of a ratio method.

Laser Flash Technique

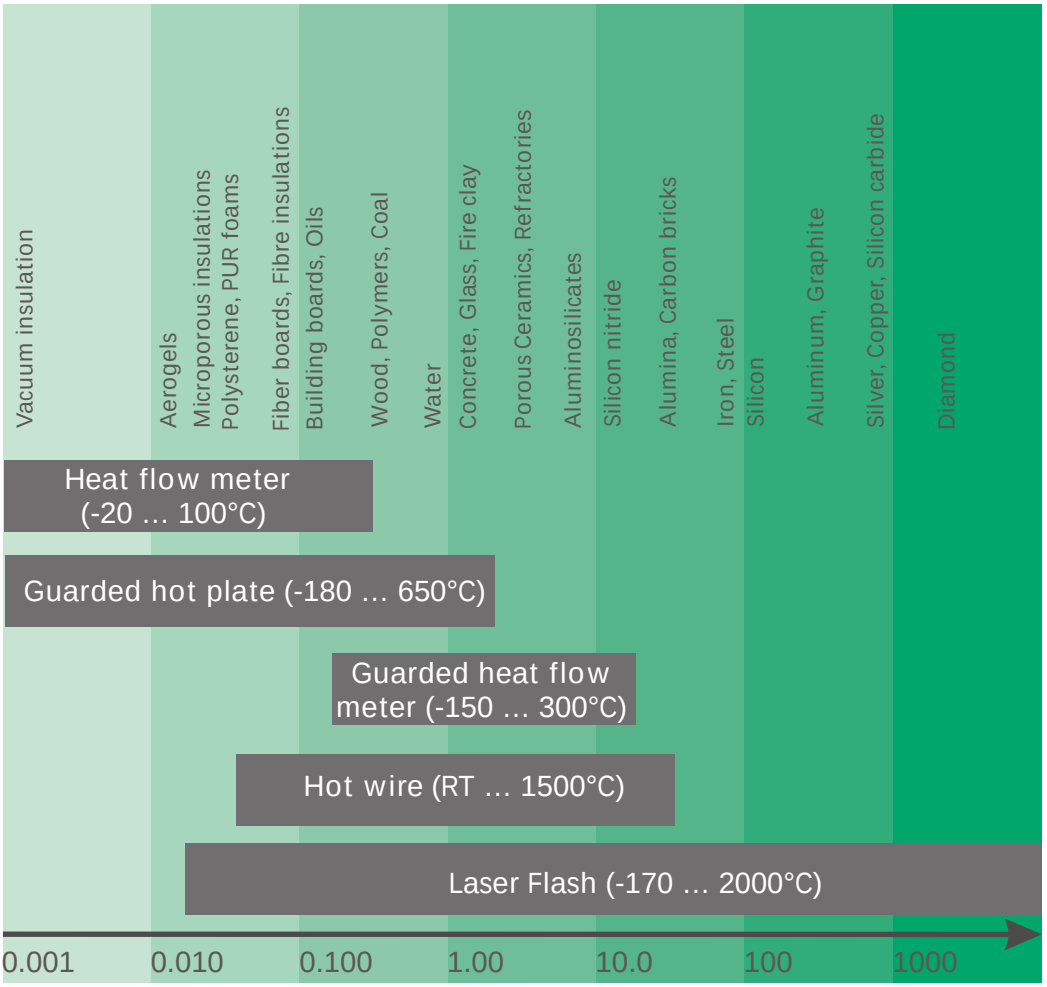
The front side of a plane-parallel sample is heated via a short laser pulse (generally <1 ms). The absorbed heat diffuses in the sample, thus leading to a temperature increase on the backside of the sample that is detected with an infrared detector.

For the evaluation of a laser flash measurement, only the timely course of the measuring signal is decisive, the level/amount of the temperature increase plays only a minor role.

A modern laser flash apparatus is, for example, the LFA 437 Microflash™ (temperature range: room temperature to 300°C), the cost-effective low-temperature sister of the LFA 427.

The instrument is equipped with an Nd:glass laser capable of producing laser pulses with energies of up to 20 J. Detection of the temperature rise on the rear surfaces is made by an InSb detector. Due to the high accuracy (<3%) combined with the possibility of analyzing multi-layer systems, the LFA 437 Microflash is ideally suited for the characterization of materials for eletronic packaging.

The laser flash technique can, in general, be used for materials with thermal conductivities between 0.05 W/mK (pressed fiber boards) and more than 2000 W/mK (diamond).



Thermal Conductivitiy at RT / W/(mK)

Trade Fairs, Symposia

We will attend the following exhibitions:

PITTCON USA	18. - 21.03.2002, New Orleans
ANALYTICA 2002 Germany	23. - 26.04.2002, Munich
ACERS USA	28. - 30.04.2002, St. Louis
SAMPE 2002 USA	13. - 15.05.2002, Long Beach, CA
PhandTA 6 Switzerland	26. - 29.05.2002, Ascona
I THERM USA	29. - 30.05.2002, San Diego, CA
PM 2 TEC USA	16. - 21.06.2002, Orlando, FL
CHINAPLAS 2002 P.R. China	25. - 29.06.202, Shanghai
ANALYTICA -Latin America Brazil	31.07. - 02.08.2002, Sao Paulo, SP
ESTAC 8 Spain	25. - 29.08.2002, Barcelona
ECTP 2002 Great Britain	03. - 05.09.2002, London
ANALYTICA CHINA P.R. China	03. - 05.09.2002, Shanghai
IMPAS 2002 USA	01. - 04.09.2002, Denver, CO
AIMAT Italy	08. - 11.09.2002, Modena
ANALYTICAL and LAB-EQUIPMENT Thailand	16. - 18.09.2002, Bangkok
NATAS USA	23. - 25.09.2002, Pittsburgh, PA

by the way

Wednesday,
April 24th, 2002:

This date is worth being highlighted in your calendar! We would like to invite you to attend two application seminars which will be held during ANALYTICA 2002.

In the morning - between 10:00 a.m. and 12:30 p.m. - everything centers on "the curing behavior of thermoplastic materials, paints and adhesives". In the afternoon - between 1:00 and 5:00 p.m. - main focus is put on "the characterization of pharmaceuticals with the aid of thermoanalytical methods".

Both seminars will be hosted by renowned lecturers from industry and research and will take place in hall B1, room 13 on the 1st floor at the NEUE MESSE Munich.

We look foward to welcoming you there.

More details on these events can be found on our internet pages www.ngb.netzsch.com or contact Silke Popp, S.popp@ngb.netzsch.com

We wish you an interesting time!

From France to Germany

Stéphanie Lemarchand

After her studies in physics and chemistry with main focus on materials analysis at the university of Rouen, France, and a 6-month training period in our applications laboratory in Selb, Stéphanie Lermarchand is now part of our laboratory team as of October 1st, 2001. Her main tasks are the conduction and interpretation of measurements in the high-temperature range.

Imprint

03/02

Publisher:
NETZSCH-Gerätebau GmbH
Wittelsbacherstr. 42
D-95100 Selb/Bavaria

Phone: (+49) 9287/881-0
Fax: (+49) 9287/881-44
e-mail: at@ngb.netzsch.com
http://www.ngb.netzsch.com

Editors:
Dr. Gabriele Kaiser
Doris Steidl

NETZSCH -
the exact solution