Hiden Isochema
Advancing Sorption Analysis

Newsletter • Autumn 2015

Introducing Hiden Isochema's All New ABR: Automated Breakthrough Analyzer

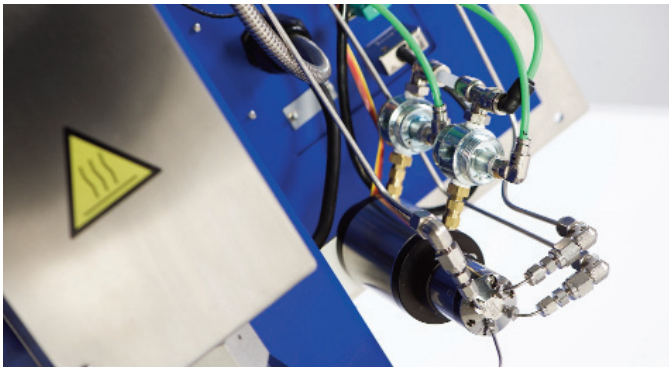
To complement our existing larger scale breakthrough reactors, Hiden Isochema are proud to announce the launch of our all new ABR automated breakthrough analyzer.

The ABR is a dedicated breakthrough analyzer, fully automated and supplied with an integrated close-coupled mass spectrometer. The ABR is available on a range of configurations to suit research-scale samples, with bed volumes from 2 cc to 20 cc. Up to 6 gas inlets are available as well as a dedicated purge stream. Flow rates are selected to suit the specific applications, and the ABR includes an ultra-low dead volume switching valve. Options include an upgrade for operation at pressures to 50 bar, and an integrated vapor generator module for gas-vapor operation.

The ABR is designed to meet the needs of researchers wishing to characterise the gas separation performance of novel materials such as metal-organic frameworks (MOFs), zeolitic imidazolate frameworks (ZIFs) and covalent organic frameworks (COFs) without the time or expense of synthesising larger quantities of material. The breakthrough data obtained is complementary to the adsorption-desorption isotherms measured with our IGA, XEMIS and IMI sorption analyzers.

ABR Key Features

- Fully automated breakthrough analyser
- Optimised for research-scale sample sizes (bed sizes from 2 cc)
- Ultralow dead volume automated switching (purge gas / process mixture)
- Options for gas-gas, gas-vapor, vapor-vapor configurations
- Optional high pressure (50 bar) configuration
- Fully integrated close-coupled mass spectrometer



For more information please contact our Sales and Application team via info@hidenisochema.com

In this issue:

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Latest XEMIS Application Data and News

- **More XEMIS data published using sample sizes from 15 mg**
- **XEMIS analyzers ordered by scientists across the world**
- **Further high quality application data presented**

We reported earlier this year publication of hydrogen adsorption data to 150 bar using our XEMIS high pressure gas sorption analyzer [1]. Recently, a subsequent article, published in the September 2015 issue of the journal Nano Energy, reported further hydrogen adsorption data on novel carbon materials with sample sizes as small as 15 mg [2].

The authors compare data measured with Hiden Isochema IGA analyzers to 20 bar, and with XEMIS analyzers to 150 bar, again with excellent agreement. They report H_2 and CO_2 uptake data along with other techniques to evaluate a 'compactivation' method involving mechanical compression prior to thermochemical activation, which yields carbons with high gravimetric and volumetric H_2 and CO_2 storage densities. Gravimetric sorption data of this quality, at high pressures, on such research-scale samples from 15 mg is uniquely possible with Hiden Isochema's XEMIS sorption analyzer.

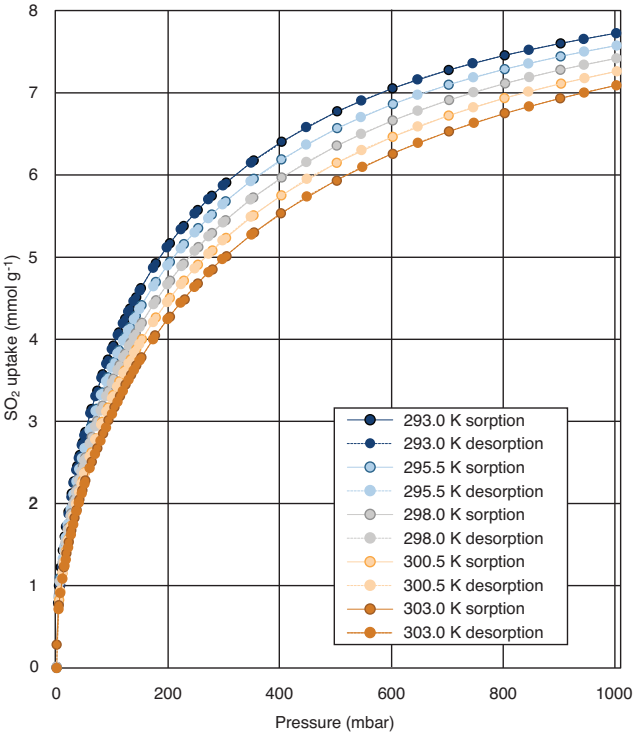


Fig.1: SO_2 adsorption-desorption isotherms on activated carbon

At our UK manufacturing headquarters, Hiden Isochema engineers have been preparing a significant number of XEMIS systems for shipment to customers across the world. This summer we have received orders for XEMIS sorption analyzers from sites ranging from the west coast of the USA, across Europe, to various locations in Asia.

…600+ articles online…isochema.com/science…

Request an application note!

We have a series of application notes from across our range of instruments available, on subjects including:

"Determination of Multicomponent Mass Transport Processes for Adsorptive Environmental Applications"

"DVS Measurement of Water Vapour Sorption by Pine Wood"

"High Pressure Methane Adsorption by Activated Carbon: Adsorption Isotherms and Isosteric Enthalpy of Adsorption"

The full listing of application notes is in the library section of our website and copies can be requested by emailing info@hidenisochema.com

XEMIS Key Features:

- **Designed for operation at high pressures (200 bar)**
- **Compatible with flammable and corrosive species**
- **Low total buoyancy for operation with small samples**
- **Full kinetic trend analysis recorded with equilibrium data**
- **Unrivalled long-term weight stability**

Customers include those already familiar with Hiden Isochema's high quality gravimetric sorption analyzers looking to extend their operating range, and new customers excited by the capabilities of the XEMIS.

The high quality data possible with XEMIS sorption analyzers is demonstrated further by the data in Fig. 1. High resolution SO_2 adsorption-desorption isotherms on a commercial activated carbon (Filtrasorb F400) are measured at 5 equally spaced temperatures, 2.5 °C apart in the range 20 – 30 °C. The lack of hysteresis and even

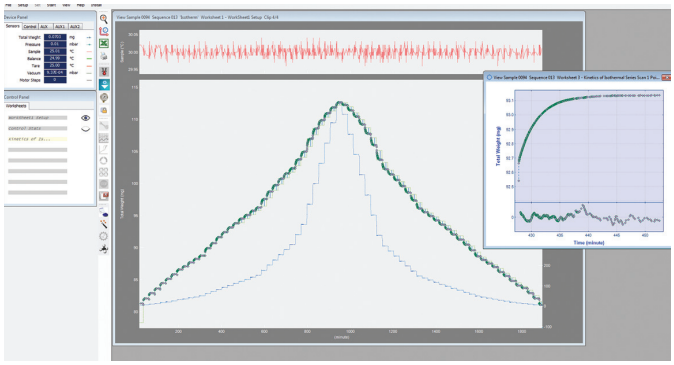


Fig. 2: Full raw data with kinetic trend analysis (inset)

spacing is clear and demonstrates excellent reversibility. Naturally, the complete kinetics are recorded simultaneously with the equilibrium data and the full raw data is readily available to users. An example of the raw data with continuous kinetic trend analysis is also shown in Fig. 2.

If you would like to receive further information on the XEMIS, or receive a quotation, please contact us now.

[1] B. Adeniran and R. Mokaya, Journal of Materials Chemistry A 3, 5148-5161 (2015).

[2] B. Adeniran and R. Mokaya, NanoEnergy 16 (2015) 173-185.

Where are you heading to this year?

Here is our latest conference schedule; we look forward to catching up with many of you out and about at conferences this year.

11th-14th Oct,	**1st EuroMOF Conference,**	Berlin, Germany
25th-29th Oct,	**AAPS Annual Meeting and Exposition,**	Orlando, USA
8th-12th Nov,	**AIChE Annual Meeting,**	Salt Lake City, USA
29th Nov-4th Dec,	**MRS Fall Meeting,**	Boston, USA

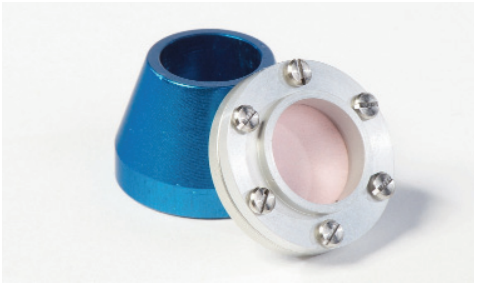
3 Year Warranty Now Standard on All IGAsorp Models

We are pleased to announce that as standard we are now offering a 3 year warranty with all new IGAsorp instruments.

The IGAsorp series of dynamic vapor sorption analyzers (DVS analyzers) have a proven track record of reliability. The IGAsorp's design and its utilization of the unique IGA method makes accurate and consistent measurements with faster measurement times. These features make the IGAsorp the instrument of choice in laboratories around the world from blue-chip organisations to research departments at leading universities.

IGAsorp analyzers are used in a diverse and ever-broadening range of application areas, including research and manufacturing within the pharmaceutical industry, characterisation of novel materials for the polymer and coating industries, investigation of the properties of biomaterials and bio-mimetic materials, and the evaluation of natural materials and analysis of their degradation in the environment.

Request your copy of the new IGAsorp brochure now, email info@hidenisochema.com



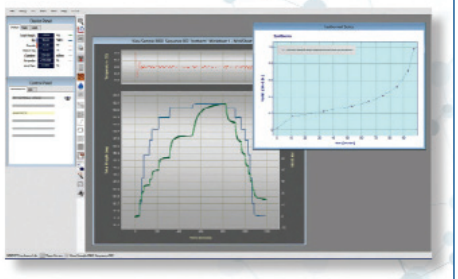
The unique permeation cell for moisture vapor transmission rate (MVTR) determination through membranes.

HISORP SOFTWARE

Fully compatible with all MS Windows® operating systems, and featuring an intuitive user interface and high resolution graphics, **HIsorp** offers the user complete control of the **IGAsorp**.

HIsorp uses the unique **IGA method** for real time kinetic analysis, and endpoint prediction. It also incorporates a series of useful and timesaving features including a PDF report generator, single click exports to Excel®, automatic email notification on completion of measurementand on-line video help.

Options include full 21CFR Part II compliance.



MH2014 Proceedings Open Access!

The MH2014 conference proceedings are now available open access on the ScienceDirect website.

The MH2014 organising committee and Professor Gavin Walker, Guest Editor, would like to thank all the authors for their contributions to this Special Issue of the Journal of Alloys and Compounds and the reviewers for their efforts.

Open access will be available for a period of 24 months from 31st August 2015

The MH2016 conference website is now available (mh2016.ch), the conference will be held in Interlaken, Switzerland from 7th to 12th August 2016.

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