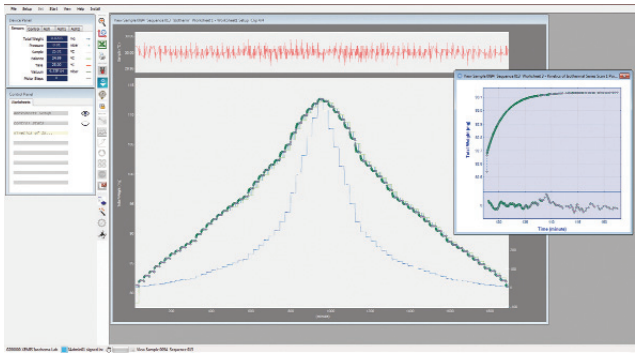
Hiden Isochema
Advancing Sorption Analysis

Newsletter • Spring/Summer 2016

New Upgrade Options for Hiden Isochema Sorption Analyzers

Hiden Isochema are proud to continue supporting instruments installed over 20 years ago, and the long service life of these instruments is testament to the instrument quality and service support offered by us. As well as investing in developing new instruments, Hiden Isochema continue to develop upgrade options for existing instruments, enabling you to increase the functionality of your instrument and expand its range of applications.
Customers with existing Hiden sorption analyzers now have a range of upgrade and overhaul options to choose from, some of these are highlighted below.

Migration to Hiden Isochema's current universal **HIsorp software platform** totally modernises the user interface and allows operation on all current and future Windows platforms. Features include improved real time processor functions, all new high resolution graphics with user-



specific display options, and multi-user access with 3 privilege levels. Additional features include single click export to Excel, an integrated PDF report generator, and email notification on measurement completion.

In parallel with migration to the powerful software platform, an **upgrade of the control electronics** provides a replacement of the process control and signal conditioning modules and renewal of the microprocessor to current specifications. In combination, these two upgrades represent a major overhaul of the process-critical functions at an affordable price.

Operation under HIsorp also opens other upgrade possibilities.

Customers with IGA-001 configurations may add the new MultiPort Inlet Selector for automated selection of different gas species; **MultiPort Inlet Selector** allows fully automated determination of consecutive gravimetric sorption isotherms with multiple species at multiple temperatures.

A new NIST traceable method is used within HIsorp to validate the combined pressure, uptake and temperature measurement in IGA and XEMIS analyzers. An *in-situ* densitometry procedure simultaneously determines the mass and volume of a calibrated float. The method is a comprehensive **conformance test for gravimetric gas sorption analyzers** to verify system operation over the full pressure range of the analyzer with all gas species including non-ideal gases such as carbon dioxide and methane.

IGAsorp and other gravimetric sorption analyzers operating in dynamic vapor mode benefit from an improved humidity conformance test routine to determine equilibrium relative humidity of a humidity standard.

The test method includes tighter tolerances and automated preconditioning as well as an option to cycle the test over extended time periods for verification of long term performance. The test applies equally to humidity feedback control and constant flow modes of dynamic vapor sorption analysis.

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Powerful New DVS Control Method

IGAsorp dynamic vapor sorption (DVS) analyzers are now available with a powerful new operating mode, allowing relative humidity (RH) to be controlled at values up to 10 times lower than possible with methods traditionally utilized in compact DVS analyzers. Climate-XT mode, unique to Hiden Isochema, applies independent, intelligent, control algorithms to the sample and humidifier thermostats to allow humidity setpoints below 0.2 %RH to be accessed.

The analyzer's HIsorp software determines and applies the humidifier temperature(s) required to attain the full range of isotherm points as entered by the user. The process is fully automated and, naturally for Hiden Isochema gravimetric sorption analyzers, the full kinetic data is recorded and analysed along with the equilibrium data.

Climate-XT mode uniquely allows fully automated access to the complete range of humidity values up to 98 %RH, with direct measurement of both humidity and temperature at the sample position. For sample temperature 50 °C, humidity may be controlled as standard down to 0.1 %RH, and further options are available for optimised temperature and humidity requirements beyond these limits.

New Applications Articles – Gas Separations and Selectivity

Porous organic cages for sulfur hexafluoride separation
T. Hassell et al, *J. Am. Chem. Soc.*, 2016, **138**, 1653-1659
DOI: 10.1021/jacs.5b11797

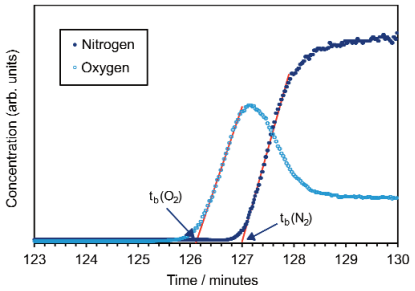
A team from three leading UK Universities report the selectivity of a number of porous organic cages for SF_6 adsorption in preference to nitrogen. A Hiden Isochema ABR automated breakthrough analyzer was used to measure the ability of the best performing material, CC3α, to separate SF_6 from a mixed SF_6 / N_2 stream under a range of conditions, with its performance being compared to that of zeolite 13X, chosen to represent a standard adsorbent

Kinetic molecular sieving, thermodynamic and structural aspects of gas/vapor sorption on metal organic framework...
X.Zhao et al, *J. Mater. Chem. A*, 2016, **4**, 1353-1365
DOI: 10.1039/C5TA08261G

An IGA series gravimetric gas and vapor sorption analyzer was used to perform an extensive analysis of the properties of a novel metal-organic framework (MOF) compound. The authors report a series of water, ethanol, oxygen, nitrogen, carbon dioxide and methane adsorption-desorption isotherms, and determine the enthalpy of adsorption, Fickian diffusion coefficients and adsorption / desorption rates. The MOF displays kinetic molecular sieving properties with high selectivities both for oxygen over nitrogen and for carbon dioxide over methane.

Laboratory scale assessment of adsorbents for gas separation applications
Chemical Engineering World, **50(12)** 2015, 50-54.

A technical article written by Hiden Isochema Product Manager Dr Darren Broom addresses the measurement of breakthrough curves in the laboratory scale assessment of adsorbents for gas separation applications. The article describes breakthrough curves and explains some of their uses. A number of different separation processes are also discussed, including hydrogen separation from syngas, nitrogen and oxygen production from air, and helium purification. The full article, along with further details on Hiden Isochema's ABR automated breakthrough analyzer, is available from us via info@hidenisochema.com



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