



## February 2015

SMS instruments are used over a wide range of disciplines. To keep abreast with current research using dynamic vapor sorption and inverse gas chromatography, SMS regularly reviews the literature. The below papers represent recent peer-reviewed articles utilizing gravimetric vapor sorption or inverse gas chromatography.

### DVS Articles:

YM Lim, P Hoobin, DY Ying, I Bugar, PR Gooley, and MA Augustin, "**Physical characterization of high amylose maize starch and acylated high amylose maize starches**" *Carbohydrate Polymers*, 117: 279-285 (2015).

K Mazeau, "**The hygroscopic power of amorphous cellulose: A modeling study**" *Carbohydrate Polymers*, 117: 585-591 (2015).

K Zapata, BA Rojano, and FB Cortes, "**Effect of relative humidity on the antioxidant activity of spray-dried banana passion fruit (*Passiflora Mollissima* Baley)-coated pulp: Measurement of the thermodynamic properties of sorption**" *Chemical Engineer Communications*, 202(3): 269-278 (2015).

E Vejmelkova, D Konokova, T Kulovana, M Keppert, J Zumar, P Rovnanikova, Z Kersner, M Sedlmajer, and R Cerny, "**Engineering properties of concrete containing natural zeolite as supplementary cementitious material: Strength, toughness, durability, and hygrothermal performance**" *Cement & Concrete Composites*, 55:259-267 (2015).

A Mignon, GJ Graulus, D Snoeck, J Martins, N De Belie, P Dubrueel, and S Van Vlierberghe, "**pH-sensitive superabsorbent polymers: a potential candidate material for self-healing concrete**" *Journal of Materials Science*, 50(2): 970-979 (2015).

XS Li, S Narayanan, VK Michaelis, TC Ong, EG Keeler, H Kim, IS McKay, RG Griffin, and EN Wang, "**Zeolite Y adsorbents with high vapor uptake capacity and robust cycling stability for potential applications in advanced adsorption heat pumps**" *Microporous and Mesoporous Materials*, 201: 151-159 (2015).

C Valenzuela and JM Aguilera, "**Effects of maltodextrin on hygroscopicity and crispness of apple leathers**" *Journal of Food Engineering*, 144: 1-9 (2015).

Q Wu, T Rougelot, N Burlion, and X Bourbon, "**Experimental investigation of the first desorption isotherm of a high performance concrete with thin sliced samples**" *Construction and Building Materials*, 72: 389-397 (2014).

M van Soestbergen and A Mavinkurve, "**Anomalous water absorption by microelectronic encapsulants due to hygrothermal-induced degradation**" *Journal of Applied Polymer Science*, 131(24): 41192 (2014).

F McGregor, A Heath, A Shea, and M Lawrence, "**The moisture buffering capacity of unfired clay masonry**" *Building and Environment*, 82: 599-607 (2014).

JM Chen, S Li, and TB Lu, "**Pharmaceutical cocrystals of Ribavirin with reduced release rates**" *Crystal Growth & Design*, 14(12): 6399-6408 (2014).

S Aitipamula, PS Chow, and RBH Tan, "**Crystal engineering of Tegafur cocrystals: Structural analysis and physicochemical properties**" *Crystal Growth & Design*, 14(12): 6557-6569 (2014).

HA Pushpadass, FME Emerald, B Chaturvedi, and KJ Rao, "**Moisture sorption behavior and thermodynamic properties of gulabjamun mix**" *Journal of Food Processing and Preservation*, 38(6): 2192-2200 (2014).

YR Wagh, HA Pushpadass, FME Emerald, and BS Nath, "**Preparation and characterization of milk protein films and their application for packaging of Cheddar cheese**" *Journal of Food Science and Technology*, 51(12): 3767-3775 (2014).

CA Cozzolino, G Cerri, A Brundu, and S Farris, "**Microfibrillated cellulose (MFC): pullulan bionanocomposite film**" *Cellulose*, 21(6): 4323-4335 (2014).

SP Casey, J Elvins, S Riffat, and A Robinson, "**Salt impregnated desiccant matrices for 'open' thermochemical energy storage-Selection, synthesis and characterisation of candidate materials**" *Energy and Buildings*, 84: 412-425 (2014).

JL Li, JQ Gao, GZ Sui, LH Jia, CL Zuo, and QG Deng, "**Influence of a glycerine additive on the structure and**





**water vapor permeance of chitosan membranes”**

*Materials Express*, 4(6): 491-498 (2014).

Y Aristov, “**Concept of adsorbent optimal for adsorptive cooling/heating**” *Applied Thermal Engineering*, 72(2): 166-175 (2014).

KK Saripella, R Mallipeddi, and SH Neau, “**Crospovidone interactions with water. II. DVS analysis of the effect of Polyplasdone particle size on its uptake and distribution of water**” *International Journal of Pharmaceutics*, 475(1-2): 174-180 (2014).

HY LI, KL Song, DG Zhou, and QL Wu, “**Effect of durability treatment on moisture sorption properties of wood-plastic composites**” *Bioresources*, 9(4): 6397-6407 (2014).

SK Scholl and SJ Schmidt, “**Determining the mechanism and parameters of hydrate formation and loss in glucose**” *Journal of Food Science*, 79(11): E2232-E2244 (2014).

S Sheokand, SR Modi, and AKL Bansal, “**DVS as a tool for characterization and quantification of amorphous content in predominantly crystalline materials**” *Journal of Pharmaceutical Sciences*, 103(11): 3364-3376 (2014).

E Ostrowaska-Ligeza, E Jakubczyk, A Gorska, M Wirkowska, and J Brys, “**The use of moisture sorption isotherms and glass transition temperature to assess the stability of powdered baby formulas**” *Journal of Thermal Analysis and Calorimetry*, 118(2): 911-918 (2014).

VA Sirotkin and AV Khadiullina, “**A study of the hydration of ribonuclease A using isothermal calorimetry-Effect of the protein hydrophobicity and polarity**” *Journal of Thermal Analysis and Calorimetry*, 118(2): 951-959 (2014).

H Zhang, W Gu, MJ Li, ZY Li, ZJ Hu and WQ Tao, “**Experimental study on the kinetics of water vapor sorption on the inner surface of silica nano-porous materials**” *International Journal of Heat and Mass Transfer*, 78(78): 947-959 (2014).

K Kulasinski, S Keten, SV Churakov, R Guyer, J Carmeliet, and D Derome, “**Molecular mechanism of moisture-induced transition in amorphous cellulose**” *ACS Macro Letters*, 3(10): 1037-1040 (2014).

SI Martinez-Monteagudo and F Salais-Fierro, “**Moisture sorption isotherms and thermodynamic properties of Mexican Mennonite-style cheese**” *Journal of Food Science and Technology*, 51(10): 2393-2403 (2014).

W Mousa, FM Ghazali, S Jinap, HM Ghazali, and S Radu, “**Sorption isotherms and isotheric heats of sorption of Malaysian paddy**” *Journal of Food Science and Technology*, 51(10): 2656-2663 (2014).

KS Varghese, K Radhakrishna, and AS Bawa, “**Moisture sorption characteristics of freeze dried whey-grape beverage**” *Journal of Food Science and Technology*, 51(10): 2734-2740 (2014).

DM Oliveira, aE Clement, and JMC da Costa, “**Hygroscopic behavior and degree of caking of grugru palm (Acrocomia aculeate) powder**” *Journal of Food Science and Technology*, 51(10): 2783-2789 (2014).

F Tatar, A Cengiz, and T Kahyaoglu, “**Effect of hemicellulose as a coating material on water sorption thermodynamics of the microencapsulated fish oil and artificial neural network (ANN) modeling of isotherms**” *Food and Bioprocess Technology*, 7(10): 2793-2802 (2014).

## IGC SEA Articles:

R Ho, Y Sun and B Chen, “**Impact of moisture and plasticizer properties on polymer-plasticizer physical mixing performance**” *Journal of Applied Polymer Science*, 132(12): 41679 (2015).

ZT Yao, LQ Ge, XS Ji, JH Tang, MH Xia, and YQ Xi, “**Surface properties studies of bivalve shell waste by the IGC technique: Probing its significant potential application in the polymer industry**” *Journal of Alloys and Compounds*, 621: 389-395 (2015).

B Geyer, S Rohner, G Lorenz, and A Kandelbauer, “**Improved thermostability and interfacial matching of nanoclay filler and ethylene vinyl alcohol matrix by silane-modification**” *Journal of Applied Polymer Science*, 132(1): 41227 (2015).

AS Munich and FORL Mertens, “**The Lewis acidic and basic character of the internal HKUST-1 surface determined by IGC**” *Crystengcomm*, 17(2): 438-447 (2015).

J Zhang, S Du, A Kafi, B Fox, JL Li, XY Liu, R Rajkhowa, and XG Wang, “**Surface energy of silk fibroin and mechanical properties of silk cocoon composites**” *RSC Advances*, 5(2): 1640-1647 (2015).

LA Onuchak, DA Ukolova, TS Burmatnova, YG Kuraeva, SA Kuvshinova, VA Burmistrov, and RF Stepanova, “**Features of the sorption redistribution of hydrocarbons and alcohols in a gas-supramolecular liquid crystal system**” *Russian Journal of Physical Chemistry*, 89(1): 129-135 (2015).

P Wu, H Gao, JS Sun, YL Ji, F Wang, and CM Gong, “**Characterization of biomass adsorbent ZSG-1 through isopropanol and water azeotrope dehydration**” *Chemical Engineering Communications*, 202(2): 252-259 (2015).

S Jaffari, B Forbes, E Collins, J Khoo, GP Martin, and D Murnane, “**Evidence for the existence of powder sub-populations in micronized materials: Aerodynamic size-fractions of aerosolized powders possess distinct physicochemical properties**” *Pharmaceutical Research*, 31(12): 3251-3264 (2014).

JM Wei, FQ Dong, YA Li, and YZ Zhang, “**Relationship analysis between surface free energy and chemical composition of asphalt binder**” *Construction and Building Materials*, 71: 116-123 (2014).

MG Cares-Pacheco, G Vaca-Medina, R Calvet, F Espitalier, JJ Letourneau, A Rouilly, and E Rodier, “**Physicochemical characterization of D-mannitol polymorphs: The challenging surface energy determination by IGC in the infinite dilution region**” *International Journal of Pharmaceutics*, 475(1-2):69-81 (2014).

V Karde and C Ghoroi, “**Influence of surface modification on wettability and surface energy characteristics of pharmaceutical excipient powders**” *International Journal of Pharmaceutics*, 475(1-2):351-363 (2014).

UV Shah, D Olusanmi, AS Narang, MA Hussain, MJ Tobyn, and JYY Heng, “**Decoupling the contribution of dispersive and acid-base components of surface energy on the cohesion of pharmaceutical powders**” *International Journal of Pharmaceutics*, 475(1-2):592-596 (2014).



B Strzemińska, A Voelkel, M Hinz, and M Rogozik  
“**Application of IGC in physicochemical characterization of phenolic resin adhesives**” *Journal of Chromatography A*, 1368: 199-203 (2014).

DM Stovall, E Hart, N Kuprasertkul, S Mehta, A Wadawadigi, WE Acree, and MH Abraham, “**Abraham model correlations describing the solubilising ability of peanut oil**” *Physics and Chemistry of Liquids*, 52(6): 792-803 (2014).

FK Kudasheva, VY Guskov, and AG Ganieva, “**IGC for identification of poly(ethylene glycol adipate) and tripropionitrilamine on the surface of polymeric sorbent**” *Protection of Metals and Physical Chemistry of Surfaces*, 50(6): 773-776 (2014).

S Mohammadi-Jam, DJ Burnett, and KE Waters, “**Surface energy of minerals – Applications to flotation**” *Minerals Engineering*, 66-68: 112-118 (2014).

B Strzemińska, A Voelkel, J Donate-Robles, and JM Martin-Martinez, “**Assessment of the surface chemistry of carbon blacks by TGA-MS, XPS and IGC using statistical chemometric analysis**” *Applied Surface Science*, 316: 315-323 (2014).

A Kondor and A Dallos, “**Adsorption isotherms of some alkyl aromatic hydrocarbons and surface energies on partially dealuminated Y fajasite zeolite by IGC**” *Journal of Chromatography A*, 1362: 250-261 (2014).

CJ Norris, M Hale, and M Bennett, “**Pyrolytic carbon: factors controlling in-rubber performance**” *Plastics Rubber and Composites*, 43(8): 245-256 (2014).

S Mohammadi-Jam and KE Waters, “**IGC applications: A review**” *Advances in Colloid and Interface Science*, 212: 21-44 (2014).

A Addoun, O Ferroukhi, M Dahmane, S Germouche, JP Bayle, and MH Germouche, “**Three nematogen azobenzene-based stationary phases for capillary GC: synthesis and comparative study**” *Chromatographia*, 77(19-20): 1367-1377 (2014).

N Arsalan, SS Palayangoda and QP Nguyen, “**Characterization of asphaltene deposition in a stainless steel tube**” *Journal of Petroleum Science and Engineering*, 121: 66-77 (2014).

## Publications:

Surface Measurement Systems' Application Notes and Case Studies

“**Evaluation of protein hydration by Inverse Gas Chromatography (IGC SEA) and Dynamic Vapor Sorption (DVS)**” *Case Study 617*.

“**Water Activity (Aw) Measurements using Payne Cell with a Flux-Calibrated Membrane and DVS**” *Application Note 62*.

## Upcoming Conferences

**German Zeolite Meeting:** Oldenburg, Germany; 25-27 February 2015; Exhibitor and Presenter.

**German Catalysis Days:** Weimar, Germany; 11-13 March 2015; Exhibitor.

**Society for Biomaterials:** Charlotte, NC, USA; 15-18 April 2015; Exhibitor and Presenter.

**Freiberger Polymertage:** Freiberg, Germany; 23-24 April 2015; Exhibitor and Presenter.

**IGC Symposium:** Newark, NJ, USA; 04-05 May 2015; Organizer and Presenter.

**DVS Vacuum Meeting:** Zurich, Switzerland; 18-19 May 2015; Organizer and Presenter. For more info, please email Dr Vladimir Martis at [vmartis@surfacemeasurementsystems.com](mailto:vmartis@surfacemeasurementsystems.com)

## Customer Support Training

**USA Office:** 19 May 2015 (DVS) and 20 May 2015 (IGC-SEA); Allentown, PA; Email [Science@surfacemeasurementsystems.com](mailto:Science@surfacemeasurementsystems.com) for details.

**UK Office:** 19 May 2015 (DVS) and 20 May 2015 (IGC-SEA); Alperton, London; Email [Science@surfacemeasurementsystems.com](mailto:Science@surfacemeasurementsystems.com) for details.

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