



October 2014

Surface Measurement Systems 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:

C Stahli, MS Mohammadi, KE Waters, and SN Nazhat, **"Characterization of aqueous interactions of copper-doped phosphate-based glasses by vapour sorption"** *Acta Biomaterialia*, 10(7): 3317-3326 (2014).

RM Delgado, G Luna-Barcenas, G Arambula-Villa, E Azuara, P Lopez-Perea, and R Salazar, **"Effect of water activity in tortilla and its relationship on the acrylamide content after frying"** *Journal of Food Engineering*, 143: 1-7 (2014).

XQ Chen, YP Fang, K Nishinari, H We, CC Sun, JR Li, and YW Jiang, **"Physicochemical characteristics of polysaccharide conjugates prepared from fresh tea leaves and their improving impaired glucose tolerance"** *Carbohydrate Polymers*, 112: 77-84 (2014).

MS Gilani, P Tingaut, and M Heeb, **"Influence of moisture on the vibro-mechanical properties of bio-engineered wood"** *Journal of Material Science*, 49(22): 7679-7687 (2014).

EK Silva, RVD Fernandes, SV Borges, DA Botrel, and F Queiroz, **"Water adsorption in rosemary essential oil microparticles: Kinetics thermodynamics and storage conditions"** *Journal of Food Engineering*, 140: 39-45 (2014).

A Kadam, T Karbowski, A Voilley, JP Bellat, O Vitrac, and F Debeaufort, **"Sorption of n-hexane in amorphous polystyrene"** *Journal of Polymer Science B*, 52(19): 1252-1258 (2014).

D Snoeck, LF Velasco, A Mignon, S Van Vilerberghe, P Dubruel, P Lodewyckx, and N De Belie, **"The influence of different drying techniques on the water sorption properties of cement-based materials"** *Cement and Concrete Research*, 64: 54-62 (2014).

M Wu, B Johannesson, and M Geiker, **"Application of water vapor sorption measurements for porosity characterization of hardened cement pastes"** *Construction and Building Materials*, 66: 621-633 (2014).

AM Adel, AL Dupont, H Abou-Yousef, A El-Gendy, S Paris, and N El-Shinnawy, **"A study of wet and dry strength properties of unaged and hygrothermally aged paper sheets reinforced with biopolymer composites"** *Journal of Applied Polymer Science*, 131(18): 40761-40773 (2014).

VR Sagar and R Kumar, **"Effect of drying treatments and storage stability on quality characteristics of bael powder"** *Journal of Food Science and Technology*, 51(9): 2162-2168 (2014).

T Kipping, R Trindade, and H Rein, **"The use of hot-melt extruded corn starch matrices as drug carrier systems: A thermophysical characterization"** *Starch-Starke*, 66(9-10): 923-933 (2014).

Q Zeng, DD Zhang, H Sun, and KF Li, **"Characterizing pore structure of cement blend pastes using water vapor sorption analysis"** *Materials Characterization*, 95: 72-84 (2014).

A Patera, K Jefimovs, A Rafsanjani, F Voisard, R Mokso, D Derome, and J Carmeliet, **"Micro-scale restraint methodology for humidity induced swelling investigated by phase contrast X-ray tomography"** *Experimental Mechanics*, 54(7): 1215-1226 (2014).

A Newman and G Zografi, **"Critical considerations for the qualitative and quantitative determination of process-induced disorder in crystalline solids"** *Journal of Pharmaceutical Sciences*, 103(9): 2595-2604 (2014).

VA Kreisberg and VP Rakcheev, **"Kinetics of water vapor sorption on porous glass as a method of porometry"** *Russian Journal of Physical Chemistry A*, 88(9): 1574-1579 (2014).

V Sant'Anna, AH Englert, APF Correa, A Brandelli, LDF Marczak, and IC Tessaro, **"Grape mark powder: Physicochemical and microbiological stability during storage and moisture sorption isotherm"** *Food and Bioprocess Technology*, 7(9): 2500-2506 (2014).

NA Mugheirbi, KJ Paluch, and L Tajber, **"Heat induced evaporative antisolvent nanoprecipitation (HIEAN) of**





itraconazole" *International Journal of Pharmaceutics*, 471(1-2): 400-411 (2014).

AG Cunha, Q Zhou, PT Larsson, and LA Berglund, "Topochemical acetylation of cellulose nanopaper structures for biocomposites: mechanisms for reduced water vapour sorption" *Cellulose*, 21(4): 2773-2787 (2014).

IK Sawhney, BC Sarkar, GR Patil, and HK Sharma, "Moisture sorption isotherms and thermodynamic properties of whey protein concentrate powder from buffalo skim milk" *Journal of Food Processing and Preservation*, 38(4): 1787-1798 (2014).

AK Apeageyi, JRA Grenfell, and GD Airey, "Evaluation of moisture sorption and diffusion characteristics of asphalt mastics using manual and automated gravimetric sorption techniques" *Journal of Materials in Civil Engineering*, 26(8): 04014045 (2014).

O Vololonirina, M Coutand, and B Perrin, "Characterization of hygrothermal properties of wood-based products – impact of moisture content and temperature" *Construction and Building Materials*, 63: 223-233 (2014).

Q Zeng, YY Wang, and KF Li, "Uniform model for moisture transport in porous materials and its application to concrete at selected Chinese regions" *Journal of Materials in Civil Engineering*, 26(6): 05014001 (2014).

IGC SEA Articles:

A Kubaczka, "Prediction of Maxwell-Stefan diffusion coefficients in polymer-multicomponent fluid systems" *Journal of Membrane Science*, 470: 389-398 (2014).

U Domanska, P Papis, and J Szydłowski, "Thermodynamics and activity coefficient at infinite dilution for organic solutes, water, and diols in the ionic liquid choline bis(trifluoromethylsulfonyl)imide" *Journal of Chemical Thermodynamics*, 77: 63-70 (2014).

C Pirez, AF Lee, C Jones, and K Wilson, "Can surface energy measurements predict the impact of catalyst hydrophobicity upon fatty acid esterification over sulfonic acid functionalised periodic mesoporous organosilicas?" *Catalysis Today*, 234: 167-173 (2014).

Z Bensaid, F Mutelet, M Bouroukba, and A Negadi, "Experimental and theoretical study of interaction between organic compounds and 1-(4-sulfobutyl)-3-methylimidazolium based ionic liquids" *Fluid Phase Equilibria*, 378: 34-43 (2014).

B Strzemiescka, A Voelkel, J Zieba-Palus, and T Lachowicz, "Assessment of the chemical changes during storage of phenol-formaldehyde resins pyrolysis gas chromatography mass spectrometry, IGC and Fourier transform infra red methods" *Journal of Chromatography A*, 1359: 255-261 (2014).

UV Shah, D Olusanmi, AS Narang, MA Hussain, JF Gamble, MJ Tobyn, and JYY Heng, "Effect of crystal habits on the surface energy and cohesion of crystalline powders" *International Journal of Pharmaceutics*, 472(1-2): 140-147 (2014).

HJ Um, K Lee, YS Cho, YS Kim, T Kim, and CR Park, "Experimental consideration of the Hansen solubility parameters of as-produced multi-walled carbon

nanotubes by IGC" *Physical Chemistry Chemical Physics*, 16(33): 17466-17472 (2014).

B Geyer, S Rohner, G Lorenz, and A Kandelbauer, "Synthesis of ethylene terephthalate and ethylene naphthalate (PET-PEN) block-co-polymers with defined surface qualities by tailoring segment" *Journal of Applied Polymer Science*, 131(17): 40731 (2014).

VY Gus'kov, YY Gainullina, SP Ivanov, and FK Kudasheva, "Thermodynamics of organic molecule adsorption on sorbents modified with 5-hydroxy-6-methyluracil by IGC" *Journal of Chromatography A*, 1356: 230-235 (2014).

JAF Gamelas, E Ferraz, and F Rocha, "An insight into the surface properties of calcined kaolinitic clays: The grinding effect" *Colloids and Surfaces A*, 455:49-57 (2014).

M Castellano, A Turturro, E Marsano, L Conzatti, and S Vicini "Hydrophobation of silica surface by silylation with new organo-silanes bearing a polybutadiene oligomer tail" *Polymer Composites*, 35(8): 1603-1613 (2014).

LS Wang and XY Wang, "Selectivities at infinite dilution of xylene isomers in ionic liquids" *Fluid Phase Equilibria*, 374: 37-47 (2014).

I Kaya and CY Pala "Thermodynamics of poly(benzyl methacrylate)-probe interactions at different temperatures by using IGC" *Fluid Phase Equilibria*, 374: 63-69 (2014).

HR Pakravan, M Jamshidi, and M Latifi, "Relationship between the surface free energy of hardened cement paste and chemical phase composition" *Journal of Industrial and Engineering Chemistry*, 20(4): 1737-1740 (2014).

RR Smith, DR Williams, DJ Burnett, and JYY Heng, "A new method to determine dispersive surface energy site distributions by IGC" *Langmuir*, 30(27): 8029-8035 (2014).

D Sevastos and A Koliadima, "Influence of temperature and pH on the transfer of SO₂ from water to air by IGC" *Water Air and Soil Pollution*, 225(7): 1901 (2014).

TW Stephens, V Chou, AN Quay, C Shen, N Dabadge, A Tian, M Loera, B Willis, A Wilson, WE Acree, P Twu, JL Anderson, and MH Abraham, "Thermochemical investigations of solute transfer into ionic liquid solvents: updated Abraham model equation coefficients for solute activity coefficient and partition coefficient predictions" *Physics and Chemistry of Liquids*, 52(4): 488-518 (2014).

JC Huang, "Liquid crystal solutions at infinite dilution: Enthalpy-entropy compensation of solutes transfer properties between phases" *Fluid Phase Equilibria*, 372: 1-6 (2014).

YS Chen, F Mutelet, and JN Jaubert, "Solubility of carbon dioxide, nitrous oxide and methane in ionic liquids at pressures close to atmospheric" *Fluid Phase Equilibria*, 372: 26-33 (2014).

F Mutelet, D Alonso, TW Stephens, WE Acree, and GA Baker, "Infinite dilution activity coefficients of solutes dissolved in two trihexyl(tetradecyl)phosphonium ionic liquids" *Journal of Chemical and Engineering Data*, 59(6): 1877-1885 (2014).



Recent Notes and Case Studies:

Application Notes and Case Studies

“Characterizing the Restoration Materials for Historic Buildings using Dynamic Vapor Sorption Technique”
DVS Application Note 61.

“Determination of Acid-Base Component of the Surface Energy by Inverse Gas Chromatography” *IGC-SEA Application Note 227.*

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

Upcoming Conferences:

AAPS Annual Meeting: San Diego, CA, USA; 02-06 November 2014; Exhibitor and Presenter.

AICHE Annual Meeting: Atlanta, GA, USA; 16-21 November 2014; Exhibitor and Presenter.

MRS Annual Meeting: Boston, MA, USA; 30 November - 05 December 2014; Exhibitor and Presenter.

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