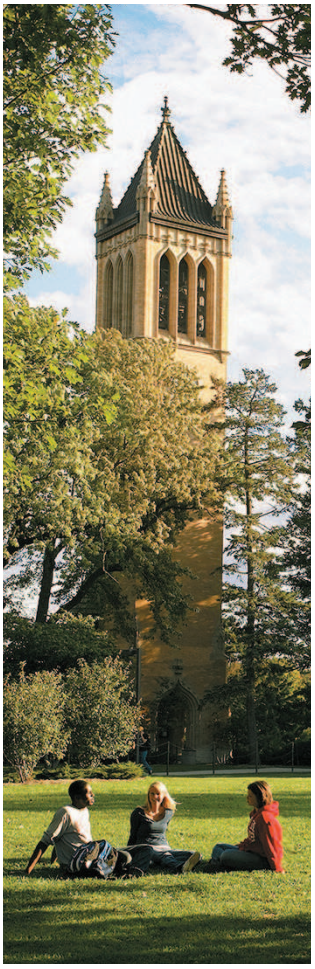
# EXTECH

## 20th International Symposium on Advances in Extraction Technologies



Gateway Hotel & Conference Center, Ames, Iowa

**JUNE 19 - 22, 2018**

JUNE 19TH - 22ND, 2018

2018 EXTECH SYMPOSIUM

**PROGRAM & BOOK OF ABSTRACTS**

**10:35 AM - 11:00 AM** **VIEW POSTER/SPONSOR EXHIBITION**
*Gallery Lobby/Central Prairie*

| | **BIOANALYTICAL APPLICATIONS**<br>*Meadow Room*<br>**Chairs: Elia Psillakis and Kevin Clark** | **THEORETICAL ASPECTS OF EXTRACTION AND SAMPLE PREPARATION**<br>*North Prairie*<br>**Chairs: Jacek Koziel and Deepak Chand** |
|---|---|---|
| **11:00 AM - 11:15 AM** | **ISRAEL DONIZETI DE SOUZA**<br>**O_58 PAGE 29**<br>*"Column Switching UHPLC-MS/MS with New Polymerizable Ionic Liquid Capillary in the First Dimension to Determine Endocannabinoids in Plasma Samples"* | **DOUGLAS E. RAYNIE**<br>**O_55 PAGE 28**<br>*"Variability of Solute-sorbent Binding Constants in SPE Materials"* |
| **11:15 AM - 11:30 AM** | **MARCELINO VARONA**<br>**O_60 PAGE 30**<br>*"Rapid Solid-Phase Microextraction of DNA from Mycobacteria in Artificial Sputum Samples Enables Visual Detection using Isothermal Amplification"* | **BULAT KENESSOV**<br>**O_30 PAGE 20**<br>*"Improved Model of Air Sampling by Porous SPME Fibers Based on COMSOL Multiphysics Software"* |
| **11:30 AM - 11:45 AM** | **JUNLANG QIU**<br>**O_53 PAGE 27**<br>*"In Vivo Tracking and Assessing of Phase I Metabolism of Fenthion in Vegetables"* | **WEI LIN**<br>**O_33 PAGE 21**<br>*"Effect of Dissolved Organic Matter on Pre-equilibrium Passive Sampling: A Predictive QSAR Modeling Study-* |
| **11:45 AM - 12:00 PM** | **CHENGHUI ZHU**<br>**O_66 PAGE 31**<br>*"New Selective DNA Extraction Method by Ion-Tagged Oligonucleotides Coupled with Magnetic Ionic Liquid Support"* | **DONGMEI LU**<br>**O_37 PAGE 22**<br>*"Application of Ionic Liquids as SO2 Gas Absorbents and Gas Chromatography Stationary Phases"* |
| **12:00 PM - 12:15 PM** | **XIONG DING**<br>**O_20 PAGE 18**<br>*"Rapid Visual DNA Analysis Using Closed-tube Isothermal Amplification Coupled with Magnetic Ionic Liquid-based Single Droplet Extraction for On-site Detection"* | **HU CHENG**<br>**O_15 PAGE 16**<br>*"Preparation of Porous Carbons as Efficient Adsorbents for Solid Phase Microextraction of Organic Pollutants"* |
| **12:15 PM - 12:30 PM** | **SHUYAO HUANG**<br>**O_28 PAGE 20**<br>*"Bioinspired Poly-dopamine Coated Order Mesoporous Carbon for Efficient Adsorption of Bilirubin"* | **HE NAN**<br>**O_41 PAGE 24**<br>*"Evaluating the Solvation Properties of Metal-containing Ionic Liquids using the Solvation Parameter Model"* |
| **12:30 PM - 12:45 PM** | **NEERAJ VERMA**<br>**O_61 PAGE 30**<br>*"Optimization of Bio-compatible Silica Coated Fiber Technology (SiFT) for the Detection of Pharmaceutical Drugs"* | **YAN LIU**<br>**O_35 PAGE 22**<br>*"A Graphene Oxide-based Polymer Composite Coating for Highly-Efficient Solid-Phase Microextraction of Phenols"* |
| **12:45 PM - 1:00 PM** | **MICHAEL S. YOUNG**<br>**O_64 PAGE 31**<br>*"Improved SPE for Low-level LC-MS Determination of Ractopamine and Other Beta-Agonist Drugs in Tissue Samples: The Oasis PRiME MCX Method"* | **DANIEL B. CARDIN**<br>**O_12 PAGE 15**<br>*"Solvent-Free Extraction Technique for Determination of Semi-Volatile Organic Compounds (SVOCs) in Water Samples by EPA Method 8270"* |

**1:20 PM** **BOARD CHARTER BUS FOR DES MOINES/ OBTAIN BOXED LUNCH WHEN BOARDING**

**1:20 PM - 5:00 PM** **TOUR OF KEMIN IN DES MOINES**

**6:30 PM - 7:30 PM** **BANQUET** *Central/South Prairie*

**8:00 PM - 11:00 PM** **DANCE** *Central/South Prairie*

## O_27: A Simple Approach to Analyzing Residual Solvents in Cannabis Concentrates via HS-GC

**Jason S. Herrington**, Colton Myers, Gary Stidsen, Ashlee Reese, Steve Kozel
Restek Corporation, USA

With more states legalizing medical and recreational use of cannabis, there is a need for analytical methodologies to ensure consumers receive safe products. Currently, there is a growing trend in new cannabis formulations. These formulations include cannabis concentrates, which are products that are made by extracting the chemical compounds, such as Delta-9-Tetrahydrocannabinol (THC) and Cannabidiol (CBD), from the cannabis plant. To do this, producers can use a variety of extraction solvents in their processes. Consequently, states are requiring that these products be tested for residual solvents. This study focused on analyzing residual solvents in cannabis concentrates with a like-USP 467 sample preparation technique. Subsequently, residual solvents were extracted with the more "classical" approach of HS-Syringe and then compared to extractions with a large volume HS-SPME approach (i.e., SPME Arrow). Comparison results and a simple solution for analyzing these complex matrices will be presented.

## O_28: Bioinspired Poly-dopamine Coated Order Mesoporous Carbon for Efficient Adsorption of Bilirubin

**Shuyao Huang** and Gangfeng Ouyang
Sun Yat-sen University, China

Hyperbilirubinemia caused by the abnormal metabolism of bilirubin may lead to serious problems to the body, therefore, the removal of excess bilirubin from blood is of great importance in clinical field. In physiological pH conditions, bilirubin are highly hydrophobic and major part of them are bonded to albumin, so effective adsorbent materials for removing excess bilirubin from albumin rich matrix are urgently needed. Among the developed sorbents, carbon materials show advantages in bilirubin adsorption due to their excellent affinity to hydrophobic substances. Herein, a novel order mesoporous carbon (OMC) based material with high specific area was synthesized in this work for bilirubin extraction. In order to avoid protein fouling, which is usually severe on carbon materials and thus leads to performance declining, a thin imprinted coating for bilirubin was formed on the suface of OMC through the self-assembly of dopamine. To obtained imprinted layer with suitable thickness, the polymerization time was optimized. The obtained OMC@PDA material showed extremely high adsorption capacity (removal rate reached 80%) to bilirubin in BSA-rich solutions, while the removal rate of OMC dropped sharply from about 80% to 20% when BSA was added in the solutions. Isothermal adsorption curve was fitted into Langmiur model and Freundlich model respectively, and the results revealed that the maximum adsorption capacity of OMC@PDA material was 314.46 mg/g, which indicated the superiority of this novel carbon material in bilirubin adsorption.

## O_29: Ultrathin Self-Assembled Diphenylalanine Nanosheets through A Gold-Stabilized Strategy for High-Efficiency Adsorption/Desorption/Ionization

**Siming Huang** and Gangfeng Ouyang
Sun Yat-sen University, China

Up to now, organic self-assembled structures have provided great potential in the applications ranging from biological to electronic fields. Diphenylalanine (FF), as the first reported dipeptide building block, has been extensively studied and fabricated into different functional micro/nanostructures for various applications. However, the FF structures obtained from the commonly used solvent-controlled methods were sensitive to the surroundings, such as temperature, solvent and etc., which seriously restricted their potential applications. We proposed a new facile strategy called gold-stabilized approach for the stable ultrathin FF/Au nanosheet design. The principle of this strategy was mainly based on the synergy of the stable binding and steric effect between AuNPs and the exposed amino groups of FF nanosheets, led to strong thermal stability and solvent resistance. For real applications, we fabricated two kinds of robust functional platforms including solid phase microextraction (SPME) probe and surface-assisted laser desorption/ionization (SALDI) plate for adsorption/desorption/ionization. Contributing to the features of remarkable accessible surfaces and strong UV laser absorption ability of this FF/Au nanosheets, the fabricated platforms possessed two advantages: 1) rapid absorption/desorption speed (within 5 min); 2) remarkable enhancement of ionization efficiency with 2 orders of magnitude.

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## O_30: Improved Model of Air Sampling by Porous SPME Fibers Based on COMSOL Multiphysics Software

**Bulat Kenessov**, Jacek Koziel, Miras Derbissalin, Olga Demyanenko
Al-Farabi Kazakh National University, Center of Physical Chemical Methods of Research and Analysis, Kazakhstan

Optimization of analytical methods based on solid-phase microextraction (SPME) using numerical modelling has many advantages including better precision, time and cost efficiency [1]. Effects of numerous extraction parameters can be quickly predicted, which simplifies a method development. Numerical simulation using COMSOL Multiphysics allowed discovering potential sources of errors during time-weighted average (TWA) sampling of volatile organic compounds (VOCs) from air using SPME [2]. The decreased accuracy of TWA SPME using porous fibers was proven to be caused by the slow diffusion of analytes in a coating. The goal of this work was to evaluate and improve the developed model for its greater accuracy and possible application for an optimization of air sampling methods based on SPME. The main problem of the current SPME model was that it considers porous coatings as the homogeneous media for simplifying calculations while they consist of solid adsorbent particles, PDMS and air. On the other hand, the most accurate model would include all phases in three dimensions, which would require extremely large amount of computing resources. Thus, a decision was made to split the model into three separate models: 1) small-scale 3D, 2) small-scale 2D, and 3) large-scale 2D. In the 3D model, a diffusion of an analyte in a small piece (10 x 10 x 50 μm) of a coating was modeled. In the small-scale 2D model (10 x 50 μm geometry), the appropriate particle (cross-section) radius was determined to obtain the same results as was earlier obtained using the 3D model. The large-scale 2D model used the same parameters as in low-scale 2D model and real SPME geometry. The large-scale 2D model included more than 10000 individual particles and required computation times >3 days on a typical PC workstation depending on an actual geometry. The addition of PDMS into the model was only possible by decreasing a diffusion coefficient in a space between particles depending on a ratio between PDMS and air in pores. The developed model was more accurate than the previously available homogeneous model. Another advantage of the new model is that it allows considering Knudsen diffusion in micropores and obtaining profiles of analytes' concentrations in solid particles. The improved model was successfully applied for optimization of VOCs extraction from air by retracted and exposed fibers. It can also be recommended for other sample matrices. *References: [1] M.N. Alam, L. Ricardez-Sandoval, J. Pawliszyn, Anal. Chem. 87 (2015) 9846–9854. [2] B. Kenessov, J. Koziel, Abstracts of ExTech (2017) 89.*

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