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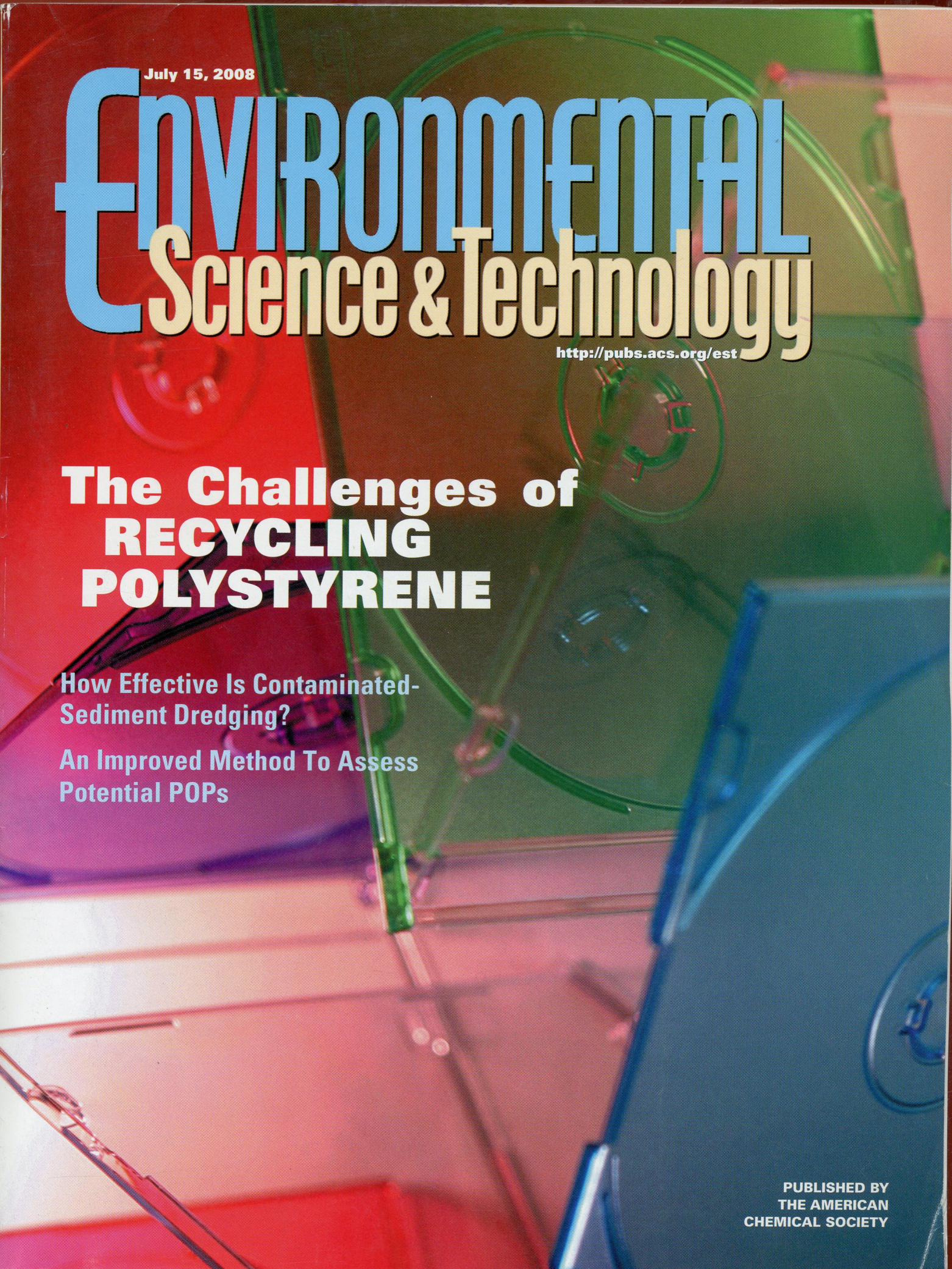

The Challenges of RECYCLING POLYSTYRENE

How Effective Is Contaminated-Sediment Dredging?

An Improved Method To Assess Potential POPs

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Research

CHARACTERIZATION OF NATURAL AND AFFECTED ENVIRONMENTS

■ 5049
Visible Light-Induced Plasmid DNA Damage Catalyzed by a CdSe/ZnS-Photosensitized Nano-TiO_2 Film

Xin-Cheng Shen, Zhi-Ling Zhang, Bo Zhou, Jun Peng, Min Xie, Min Zhang, and Dai-Wen Pang*

CdSe/ZnS-photosensitized nano-TiO_2 films are of good photocatalytic ability to damage DNA and living bacteria under visible light.

5055
Occurrence of Two Genotypes of Tetracycline (TC) Resistance Gene *tet*(M) in the TC-Resistant Bacteria in Marine Sediments of Japan

M. Habibur Rahman, Lisa Nonaka, Ryosuke Tago, and Satoru Suzuki*

tet(M) in marine sediment is investigated.

■ 5062
The Influence of the Pre-Oxidation of Natural Organic Matter on the Formation of *N*-Nitrosodimethylamine (NDMA)

Zhuo Chen* and Richard L. Valentine*

NDMA formation from chloramination of NOM may be significantly reduced by a variety of preoxidants in proportional to the reduction in SUVA that also occurs as a consequence of these treatments.

■ 5068
Characteristics of Particulate Carbon Emissions from Real-World Chinese Coal Combustion

Yuanxun Zhang, James Jay Schauer, Yuanhang Zhang, Limin Zeng, Yongjie Wei, Yuan Liu, and Min Shao*

Characterization of the emissions of the carbonaceous aerosols and molecular markers from real-world Chinese industrial and residential combustion of wood.

5074
Indoor Levels of Polycyclic Aromatic Hydrocarbons in Homes with or without Wood Burning for Heating

Pernilla Gustafson,* Conny Östman, and Gerd Sällsten

Domestic wood burning for space heating or pleasure increases indoor levels of many polycyclic aromatic hydrocarbons.

ENVIRONMENTAL PROCESSES

5081
Ozonolysis of β-Pinene: Temperature Dependence of Secondary Organic Aerosol Mass Fraction

Ravikant Pathak, Neil M. Donahue, and Spyros N. Pandis*

Measurements of the formation of organic particulate matter during the atmospheric oxidation of one of the major biogenic hydrocarbons.

■ 5087
Seasonal and Diurnal Variation of $PM_{2.5}$ Apparent Particle Density in Urban Air in Augsburg, Germany

Mike Pitz,* Otmar Schmid, Joachim Heinrich, Wolfram Birmili, Jürgen Maguhn, Ralf Zimmermann, H.-Erich Wichmann, Annette Peters, and Josef Cyrys

Apparent particle density of urban $PM_{2.5}$ shows pronounced seasonal and diurnal variation and strong correlations to standard particulate and meteorological parameters.

5094
Combining Spectroscopic and Potentiometric Approaches to Characterize Competitive Binding to Humic Substances

Laura Marang, Pascal E. Reiller, Sascha Eidner, Michael U. Kumke, and Marc F. Benedetti*

Competitive binding between a rare earth analogue and divalent cations onto humic substances reveals different binding sites for the rare earth elements.

■ 5099
***Dehalococcoides*' Gene Transcripts As Quantitative Bioindicators of Tetrachloroethene, Trichloroethene, and *cis*-1,2-Dichloroethene Dehalorespiration Rates**

Brian G. Rahm and Ruth E. Richardson*

This study explores the relationship between transcript abundance and respiration rate in tetrachloroethene-, trichloroethene-, and *cis*-1,2-dichloroethene-fed pseudosteady-state mixed cultures containing *Dehalococcoides ethenogenes*.

■ 5106
Difference of Toxicity and Accumulation of Methylated and Inorganic Arsenic in Arsenic-Hyperaccumulating and -Hypertolerant Plants

Ze-Chun Huang, Tong-Bin Chen,* Mei Lei, Ying-Ru Liu, and Tian-Dou Hu

Arsenic reduction, demethylation, toxicity, accumulation, and translocation in As-hyperaccumulating and -hypertolerant plants were compared using the XANES method.

■ 5112
Combined Gel Probes for the In Situ Determination of Dissolved Reactive Phosphorus in Porewaters and Characterization of Sediment Reactivity

Phil Monbet,* Ian D. McKelvie, and Paul. J. Worsfold

Diffusive gel probes (DGT and DET) are used in a back-to-back configuration to investigate phosphorus dynamics in eutrophic coastal lagoon sediments.

5118
Mercury in Southeastern U.S. Riverine Fish Populations Linked to Water Body Type

Andrew L. Rypel, D. Albrey Arrington, and Robert H. Findlay*

Mercury in fishes is 3-fold higher in an unregulated Alabama river vs a nearby regulated river; this pattern is consistent across southeastern coastal plain rivers.

■ 5125
Dissolved Gaseous Mercury Concentrations and Mercury Volatilization in a Frozen Freshwater Fluvial Lake

N. J. O'Driscoll,* L. Poissant, J. Canário, and D. R. S. Lean

Mercury inputs from both sediment diffusion and melting snow and ice explain the lack of correlation between dissolved gaseous mercury and mercury volatilization in a frozen lake.

■ 5131
Fate of Tetracycline Resistance Genes in Aquatic Systems: Migration from the Water Column to Peripheral Biofilms

Christina A. Engemann, Patricia L. Keen, Charles W. Knapp, Kenneth J. Hall, and David W. Graham*

Most anthropogenic antibiotic resistance genes released into water disappear prior to reaching peripheral compartments; however, gene migration still occurs into biofilms and should be considered in future gene-fate models.

■ 5137

Transitional Adsorption and Partition of Nonpolar and Polar Aromatic Contaminants by Biochars of Pine Needles with Different Pyrolytic Temperatures

Baoliang Chen,* Dandan Zhou, and Lizhong Zhu

The quantitative contributions of adsorption and partition of biochars are determined by the relative carbonized and noncarbonized fractions and their surface and bulk properties.

5144

The Internal Distribution of Nickel and Thallium in Two Freshwater Invertebrates and its Relevance to Trophic Transfer

Julie Dumas and Landis Hare*

Thallium and nickel are efficiently transferred from prey to predator, and transfer efficiency is related to subcellular metal distributions in prey.

■ 5150

Reduction of Oxidized Mercury Species by Dicarboxylic Acids (C_2–C_4): Kinetic and Product Studies

Lin Si and Parisa A. Ariya*

The kinetic data and product identification are obtained for the reduction of Hg^{II} by dicarboxylic acids (C_2–C_4), of which the tentative mechanism is proposed.

■ 5156

Do Ponds Cause Arsenic-Pollution of Groundwater in the Bengal Basin? An Answer from West Bengal

S. Sengupta, J. M. McArthur,* A. Sarkar, M. J. Leng, P. Ravenscroft, R. J. Howarth, and D. M. Banerjee

Conservative ($\delta^{18}O$, $\delta^{2}H$, K), and other tracers (Ca, Mg) of recharge in the Bengal Basin show that pond water drives neither FeOOH-reduction nor arsenic pollution.

5165

Catalytic Wet Air Oxidation of Aniline with Nanocasted Mn–Ce-Oxide Catalyst

R. Levi, M. Milman, M. V. Landau,* A. Brenner, and M. Herskowitz

Stable performance was observed in CWAO of acidified aniline (HCl/aniline = 1.2) in a trickle-bed reactor with nanocasted Mn–Ce-oxide catalyst yielding complete/90% aniline/TOC conversions.

■ 5171

Spatial and Seasonal Trends in Biogenic Secondary Organic Aerosol Tracers and Water-Soluble Organic Carbon in the Southeastern United States

Xiang Ding, Mei Zheng,* Liping Yu, Xiaolu Zhang, Rodney J. Weber, Bo Yan, Armistead G. Russell, Eric S. Edgerton, and Xinming Wang

Spatial and seasonal variations of isoprene and pinene SOA tracers and WSOC are investigated using one-year period samples collected at four CACHE (carbonaceous aerosol characterization experiment) sites.

■ 5177

Laboratory Measurements of the Heterogeneous Oxidation of Condensed-Phase Organic Molecular Makers for Meat Cooking Emissions

Emily A. Weitkamp, Kara E. Huff Hartz, Amy M. Sage, Neil M. Donahue, and Allen L. Robinson*

Molecular markers for meat cooking oxidize rapidly in complex mixtures, and create large biases in source apportionment estimates for fine particulate matter.

ENVIRONMENTAL MODELING

5183

Modeling Dynamic Exchange of Gaseous Elemental Mercury at Polar Sunrise

Ashu P. Dastoor,* Didier Davignon, Nicolas Theys, Michel Van Roozendael, Alexandra Steffen, and Parisa A. Ariya

This study describes development of an atmospheric mercury model to simulate the springtime dynamic mercury cycling in the Polar Regions.

■ 5189

How Do the Partitioning Properties of Polyhalogenated POPs Change When Chlorine Is Replaced with Bromine?

Tomasz Puzyn,* Noriyuki Suzuki, and Maciej Haranczyk

Computational study on the effect of replacement of chlorine with bromine on partition coefficients of persistent organic pollutants and its environmental consequences.

■ 5196

Atmospheric Transport and Outflow of Polycyclic Aromatic Hydrocarbons from China

Chang Lang, Shu Tao,* Wenxin Liu, Yanxu Zhang, and Staci Simonich

PAH outflow from China accounts for 7.1% of the total local emission and is under strong influence of regional climate conditions.

■ 5202

▶ **Screening Chemicals for the Potential to be Persistent Organic Pollutants: A Case Study of Arctic Contaminants**

Trevor N. Brown and Frank Wania*

A highly selective screening method identifies 120 chemicals with partitioning, persistence, or structural attributes as well as production volumes that flag them as potential Arctic contaminants.

■ 5210

Quantitative Structure–Property Relationships for Predicting Metal Binding by Organic Ligands

Stephen E. Cabaniss

Predictions of metal–organic complexation constants using only elemental and functional group composition have typical errors of 1 log unit for seven metals.

ENVIRONMENTAL MEASUREMENTS METHODS

■ 5217

Determination of Primary, Secondary, and Tertiary Amines in Air by Direct or Diffusion Sampling Followed by Determination with Liquid Chromatography and Tandem Mass Spectrometry

Michael Rampfl,* Stefan Mair, Florian Mayer, Klaus Sedlbauer, Klaus Breuer, and Reinhard Niessner

The paper describes methods for direct and diffusive sampling and LC-MS/MS analysis of primary, secondary, and tertiary amines in material exhalation and ambient air samples.

5223

Effects of Sampling Artifacts on Occupational Samples of Diesel Particulate Matter

James Noll* and M. Eileen Birch

Correction for organic carbon sampling artifacts associated with quartz fiber filter collection of diesel particle matter in occupational setttings is examined.

■ 5229

Real-Time PCR Detection and Quantification of Nine Potential Sources of Fecal Contamination by Analysis of Mitochondrial Cytochrome *b* Targets

William B. Schill* and Melvin V. Mathes

We describe quantitative polymerase chain reaction assays to determine mitochondrial DNA concentrations of nine vertebrate species and detect fecal contamination in environmental waters.

5235

An Empirical Approach to Estimating Detection Limits Using Collocated Data

Nicole P. Hyslop* and Warren H. White

Whole system detection limits are derived from XRF measurements using routine quality assurance data from two national $PM_{2.5}$ monitoring networks and IUPAC guidance.

■ **5241**

Experimental Investigation of the Rising Behavior of CO_2 Droplets in Seawater under Hydrate-Forming Conditions

Nikolaus K. Bigalke,* Gregor Rehder, and Giselher Gust

Experimentally determined rise velocities of both hydrate coated and pure liquid CO_2 droplets in pressurized seawater are reported and used to evaluate recent model parametrizations.

REMEDIATION AND CONTROL TECHNOLOGIES

■ **5247**

Heavy Metal Capture and Accumulation in Bioretention Media

Houng Li and Allen P. Davis*

Heavy metal accumulation profiles in bioretention media show a high surface accumulation, significantly decreasing with media depth.

5254

Persistence of Pathogenic Prion Protein during Simulated Wastewater Treatment Processes

Glen T. Hinckley, Christopher J. Johnson, Kurt H. Jacobson, Christian Bartholomay, Katherine D. McMahon, Debbie McKenzie, Judd M. Aiken, and Joel A. Pedersen*

The disease-associated form of the prion protein partitions to activated sludge solids and survives simulated mesophilic anaerobic sludge digestion.

■ **5260**

Quantification of Functional Groups and Modeling of Their Ionization Behavior in the Active Layer of FT30 Reverse Osmosis Membrane

Orlando Coronell, Benito J. Mariñas,* Xijing Zhang, and David G. Cahill

Carboxylic and amine groups in the active layer of FT30 RO membrane are characterized by Rutherford Backscattering spectrometry using silver and tungstate ions as probes.

5267

A Plate Produced by Nonmetallic Materials of Pulverized Waste Printed Circuit Boards

Jie Guo, Bin Cao, Jiuyong Guo, and Zhenming Xu*

A new method for resource utilization of nonmetallic materials reclaimed from waste printed circuit boards attains significant environmental benefits.

5272

Electrostatic Separation for Recovering Metals and Nonmetals from Waste Printed Circuit Board: Problems and Improvements

Jiang Wu, Jia Li, and Zhenming Xu*

This study reports problems and improvements in electrostatic separation of waste printed circuit boards using a roll-type separator.

■ **5277**

Transformation of Oxidation Products and Reduction of Estrogenic Activity of 17β-Estradiol by a Heterogeneous Photo-Fenton Reaction

Yaping Zhao,* Jiangyong Hu,* and Wei Jin

The reduction of 17β-estradiol with a relative estrogenicity and its degradation pathway by α-FeOOHR photocatalysis are investigated.

■ **5285**

Reactive Tracer Tests To Predict Dense Nonaqueous Phase Liquid Dissolution Dynamics in Laboratory Flow Chambers

X. Chen and J. W. Jawitz*

A single measureable parameter, reactive travel time variance, can be measured from tracer tests and then used to predict contaminant dissolution.

■ **5292**

Nanofiltration for Trace Organic Contaminant Removal: Structure, Solution, and Membrane Fouling Effects on the Rejection of Perfluorochemicals

Eva Steinle-Darling and Martin Reinhard*

The rejection of perfluorochemicals by NF membranes is generally effective, but can be decreased by lowered pH, membrane fouling, or increased membrane affinity (i.e., sorption).

■ **5298**

Determining Optimal Operation Parameters for Reducing PCDD/F Emissions (I-TEQ values) from the Iron Ore Sintering Process by Using the Taguchi Experimental Design

Yu-Cheng Chen, Perng-Jy Tsai,* and Jin-Luh Mou

The Taguchi experimental design is used to identify the optimal operating condition, and it provides useful approaches for reducing PCDD/Fs formations during the iron ore sintering process.

5304

Development of Silica/Vanadia/Titania Catalysts for Removal of Elemental Mercury from Coal-Combustion Flue Gas

Ying Li, Patrick D. Murphy, Chang-Yu Wu,* Kevin W. Powers, and Jean-Claude J. Bonzongo

Enhancement in elemental mercury removal from simulated coal-combustion flue gas is achieved through optimizing the composition and microstructures of synthesized silica/vanadia/titania catalysts.

■ **5310**

Affinity of Functional Groups for Membrane Surfaces: Implications for Physically Irreversible Fouling

Hiroshi Yamamura, Katsuki Kimura,* Takaharu Okajima, Hiroshi Tokumoto, and Yoshimasa Watanabe

The affinity of carbohydrate-like substances to two different microfiltration membranes is investigated by atomic force microscopy and functionally modified microspheres.

SUSTAINABILITY ENGINEERING AND GREEN CHEMISTRY

■ **5316**

Reactivity Enhancement of 2-Propanol Photocatalysis on SO_4^{2-}/TiO_2: Insights from Solid-State NMR Spectroscopy

Hailu Zhang, Huaguang Yu, Anmin Zheng, Shenhui Li, Wanling Shen, and Feng Deng*

Photocatalytic activity toward 2-propanol is remarkably enhanced on sulfated TiO_2 due to the preferential formation of Ti-bound 2-propoxy species.

ECOTOXICOLOGY AND HUMAN ENVIRONMENTAL HEALTH

CORRESPONDENCE AND REBUTTAL

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