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Fish, Fishing, and **Pollutant REDUCTION** *in the Baltic Sea*

Chemical Dynamics of Sedimentary Acid Volatile Sulfide

**Five Elements for Organizational Decision-Making
with an Environmental Management System**

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THE AMERICAN
CHEMICAL SOCIETY**

Policy Analysis

■ 1921

Learning as an Objective within a Structured Risk Management Decision Process

Timothy L. McDaniels and Robin Gregory

The emphasis in this paper is on the role of learning as a means to foster good decision processes within stakeholder groups.

1927

Five Elements for Organizational Decision-Making with an Environmental Management System

Deanna H. Matthews, Gwen C. Christini, and Chris T. Hendrickson

Environmental management systems should incorporate five elements: process flow diagrams, goals linked to strategy, information systems, risk assessment tools, and collaboration of environmental personnel to aid decision makers.

Characterization of Natural and Affected Environments

1933

Characteristics of Nucleation and Growth Events of Ultrafine Particles Measured in Rochester, NY

Cheol-Heon Jeong, Philip K. Hopke, David Chalupa, and Mark Utell

The long-term measurement of number concentrations of particles (11–470 nm), especially in terms of the relationship between SO₂ and nucleation events, is described.

■ 1941

Atmospheric Deposition of Polycyclic Aromatic Hydrocarbons to Atlantic Canada: Geographic and Temporal Distributions and Trends 1980–2001

Guy L. Brun, Om C. Vaidya, and Martin G. Léger

Measurements made in wet precipitation samples collected in Atlantic Canada between 1980 and 2001 indicate significant seasonal and long-term decreasing trends in PAHs starting in the mid-1980s.

1949

Comparing Air Dispersion Model Predictions with Measured Concentrations of VOCs in Urban Communities

Gregory C. Pratt, Chun Yi Wu, Don Bock, John L. Adgate, Gurumurthy Ramachandran, Thomas H. Stock, Maria Morandi, and Ken Sexton

Modeled 48-h average VOC concentrations are generally within a factor of 2 of measurements, and the main source of error is emissions.

1960

Levels of PCDD/Fs, PCBs, and PCNs in Soils and Vegetation in an Area with Chemical and Petrochemical Industries

Marta Schuhmacher, Marti Nadal, and Jose Luis Domingo

Concentrations of PCDDs, PCDFs, PCBs, and PCNs are determined in soil and wild chard samples from an area with chemical and petrochemical industries in Spain.

■ 1970

Fish, Fishing, and Pollutant Reduction in the Baltic Sea

Brian R. MacKenzie, Lisa Almesjö, and Sture Hansson

The Baltic Sea fish community is an important PCB sink, and fishing annually removes tens of kilograms of PCBs from the ecosystem.

1977

Atmospheric Mercury Emissions and Speciation at the Sulphur Bank Mercury Mine Superfund Site, Northern California

David M. Nacht, Mae Sexauer Gustin, Mark A. Engle, Richard E. Zehner, and Anthony D. Giglioli

High emission of Hg to the atmosphere and elevated concentrations of reactive gaseous mercury are important considerations for the Sulphur Bank Mercury Mine.

1984

Halogen Retention, Organohalogenes, and the Role of Organic Matter Decomposition on Halogen Enrichment in Two Chilean Peat Bogs

H. Biester, F. Keppler, A. Putschew, A. Martinez-Cortizas, and M. Petri

Halogens are retained in peat bogs through natural formation of organohalogen compounds, and their fate is mainly controlled by peat decomposition processes.

1992

Radiocarbon Evidence for a Naturally Produced, Bioaccumulating Halogenated Organic Compound

Christopher M. Reddy, Li Xu, Gregory W. O'Neil, Robert K. Nelson, Timothy I. Eglinton, D. John Faulkner, Ross Norstrom, Peter S. Ross, and Sheryl A. Tittlemier

Radiocarbon analysis of 1,1'-dimethyl-3,3',4,4'-tetrabromo-5,5'-dichloro-2,2'-bipyrrrole isolated from marine animals indicates that this compound has at least a natural source.

1998

Emissions of the Refrigerants HFC-134a, HCFC-22, and CFC-12 from Road Traffic: Results from a Tunnel Study (Gubrist Tunnel, Switzerland)

Konrad Stemmler, Simon O'Doherty, Brigitte Buchmann, and Stefan Reimann

Measurements of fluorinated refrigerants lost from automobile air conditioning and refrigeration transport in vehicles crossing a tunnel in Central Europe are reported.

2005

Methane Emissions from Vehicles

E. K. Nam, T. E. Jensen, and T. J. Wallington

The global vehicle fleet emits an estimated 0.45 ± 0.12 Tg/year of CH₄ representing <0.2% of anthropogenic CH₄ emissions.

Environmental Processes

■ 2011

Distribution of Phthalate Esters in a Marine Aquatic Food Web: Comparison to Polychlorinated Biphenyls

Cheryl E. Mackintosh, Javier Maldonado, Jing Hongwu, Natasha Hoover, Audrey Chong, Michael G. Ikononou, and Frank A. P. C. Gobas

A field study demonstrates that dialkyl phthalate esters do not biomagnify, but PCBs in the same marine food web do.

2021

Flux and Product Distribution during Biological Treatment of Tetrachloroethene Dense Non-Aqueous-Phase Liquid

David T. Adamson, Delina Y. Lyon, and Joseph B. Hughes

A multiphase mass balance approach demonstrates that reductive dechlorination of mixed tetrachloroethene (PCE) non-aqueous-phase liquid results in similar flux rates regardless of initial PCE mole fraction.

■ Supporting Information is available free of charge via the Internet at <http://pubs.acs.org>.

► This issue contains a news story about this research.

2029

Bioavailability of PAHs: Effects of Soot Carbon and PAH Source

Waverly A. Thorsen, W. Gregory Cope, and Damian Shea

Field- and laboratory-derived biota-sediment accumulation factors provide evidence that PAH source and sediment soot carbon influence PAH bioavailability in the aquatic environment.

2038

Oxygen Tolerance of Sulfate-Reducing Bacteria in Activated Sludge

Kasper U. Kjeldsen, Catherine Joulain, and Kjeld Ingvorsen

Sulfate reduction in activated sludge and effects of oxygenation on the activity and survival of sulfate-reducing bacteria are presented.

2044

Evidence for the Interaction of Technetium Colloids with Humic Substances by X-ray Absorption Spectroscopy

A. Maes, K. Geraedts, C. Bruggeman, J. Vancluysen, A. Rossberg, and C. Hennig

A new type of sorption process named "colloidal interaction with humic substances" is evidenced for Tc(IV) in near-natural geochemical conditions by X-ray absorption spectroscopy measurements.

2052

Key Role of the Low Molecular Size Fraction of Soil Humic Acids for Fluorescence and Photoinductive Activity

C. Richard, O. Trubetskaya, O. Trubetskoj, O. Reznikova, G. Afanas'eva, J.-P. Aguer, and G. Guyot

The fractionation by tandem SEC-PAGE of soil-extracted HAs yields clear differences between fractions in terms of fluorescence and photoinductive activity.

■ 2058

Mechanisms and Products of Surface-Mediated Reductive Dehalogenation of Carbon Tetrachloride by Fe(II) on Goethite

Martin Elsner, Stefan B. Haderlein, Thomas Kellerhals, Samuel Luzi, Luc Zwank, Werner Angst, and René P. Schwarzenbach

Dehalogenation of carbon tetrachloride by goethite/Fe(II) at pH 7 led to chloroform, carbon monoxide, and formate as major products with trichloromethyl radicals as short-lived intermediates and an initial cleavage of only one C-Cl bond.

2067

Uranium Immobilization by Sulfate-Reducing Biofilms

Haluk Beyenal, Rajesh K. Sani, Brent M. Peyton, Alice C. Dohnalkova, James E. Amonette, and Zbigniew Lewandowski

Hexavalent uranium was immobilized in the biofilms of *Desulfovibrio desulfuricans* as a result of enzymatic chemical processes by reacting with microbially generated H₂S.

2075

Dehalococcoides ethenogenes Strain 195 Reductively Dechlorinates Diverse Chlorinated Aromatic Pollutants

Donna E. Fennell, Ivonne Nijenhuis, Susan F. Wilson, Stephen H. Zinder, and Max M. Häggblom

Dehalococcoides ethenogenes strain 195, previously known for dehalorespiration with chloroethenes, also dehalogenates diverse chlorinated aromatic compounds that include chlorinated dibenzo-*p*-dioxins, dibenzofurans, biphenyls, naphthalenes, and benzenes.

2082

Solvent-Specific Photolytic Behavior of Octachlorodibenzo-*p*-dioxin

Jina Choi, Wonyong Choi, and Byung Jin Mhin

The homogeneous photolysis of octachlorodibenzo-*p*-dioxin is carried out in various organic solvents to understand the highly solvent-specific photolytic behaviors in relation to solvent properties.

2089

Measurement of Mixing-Controlled Reactive Transport in Homogeneous Porous Media and Its Prediction from Conservative Tracer Test Data

Surabhin C. Jose and Olaf A. Cirpka

An acidic fluorescein solution in a sand column is replaced by an alkaline tracer-free solution; the fluorescence intensity quantifies mixing in the porous medium.

2097

In Situ Formed Soot Deposit as a Carbon Source for Polychlorinated Dibenzo-*p*-dioxins and Dibenzofurans

Evalena Wikström, Shawn Ryan, Abderrahmane Touati, and Brian K. Gullett

The importance of carbon structure in an in situ-formed soot matrix for de novo formation of polychlorinated dibenzo-*p*-dioxins and dibenzofurans is demonstrated.

2102

Reduction of Benzene and Naphthalene Mass Transfer from Crude Oils by Aging-Induced Interfacial Films

Subhasis Ghoshal, Catherine Pasjon, and Mohammed Alshafie

Interfacial films composed of asphaltenes and resins reduced mass transfer coefficients of benzene and naphthalene up to 80% during aging in petroleum oil-water systems.

2111

Bromamine Decomposition Kinetics in Aqueous Solutions

Hongxia Lei, Benito J. Mariñas, and Roger A. Minear

Monobromamine disproportionates reversibly into dibromamine and ammonia according to a general acid-catalyzed reaction, and the two combined bromine species subsequently decompose irreversibly into unidentified products.

2120

Determination of Strong Ligand Sites in Sewage Effluent-Impacted Waters by Competitive Ligand Titration with Silver

D. Scott Smith, Russell A. Bell, John Valliant, and James R. Kramer

A method to estimate strong ligand site concentrations in sewage effluent samples is applied, and estimated concentrations agree with independent chromium-reducible sulfide measurements.

Environmental Modeling

■ 2126

Multimedia Fate Model for Hexachlorocyclohexane in Tianjin, China

Hongying Cao, Shu Tao, Fuliu Xu, Raymond M. Coveney, Jr., Jun Cao, Bengang Li, Wenxin Liu, Xuejun Wang, Jianying Hu, Weiran Shen, Baoping Qin, and Ren Sun

The fate of γ -HCH in Tianjin, China, in the 1980s is modeled.

2133

Impact of Finer Grid Resolution on the Spatial Distribution of Vehicle Emissions Inventories

Debbie A. Niemeier and Yi Zheng

The spatial impact of increased grid resolution on mobile source inventory distributions is examined.