Articles in Press

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2 Source identification and health risk of polycyclic aromatic hydrocarbons associated with electronic dismantling in Guiyu town, South China
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3 Emulsion polymerization of vinyl acetate: Safe optimization of a hazardous complex process
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Polymerizations can be hazardous complex processes difficult to be safely optimized. The procedure was validated through experiments on vinyl acetate homopolymerization. The reported approach can be generalized to other complex hazardous reacting systems.

4 Chemical and toxicological evolution of the antibiotic sulfamethoxazole under ozone treatment in water
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Degradation of tetracycline in aqueous media by ozonation in an internal loop-lift reactor

Yan Wang, Hui Zhang, Jianhua Zhang, Chen Lu, Qianqian Huang, Jie Wu, Fang Liu

Highlights
- Very high removal efficiency of cadmium was achieved by electrocoagulation.
- Alternating current (AC) avoids oxide layer and corrosion on anode surface.
- Good current transfer between anode and cathode results more removal efficiency.
- Compact treatment facility and complete automation.
- Aluminum alloy anode prevents residual aluminum in treated water.

Removal of malachite green by adsorption and precipitation using aminopropyl functionalized magnesium phyllosilicate

Young-Chul Lee, Eui Jin Kim, Ji-Won Yang, Hyun-Jae Shin

Highlights
- Preparation of aminopropyl functionalized magnesium phyllosilicate (AMP clay).
- Characterization of AMP clay and AMP clay-malachite green (MG) mixture.
- Novel precipitation mechanism including MG fading plus collapsed AMP clay.
- Adsorption kinetics and thermodynamics of MG using AMP clay.

Radiological hazards of TENORM in precipitated calcium carbonate generated as waste at nitrophosphate fertilizer plant in Pakistan

Sabah- Javed, Nasim- Akhtar, M. Tufail

Highlights
- NORM (naturally occurring radioactive material) in phosphate rock (PR) is converted to TENORM (technologically enhanced naturally occurring radioactive material) as a result of chemical processing of the PR to make phosphate fertilizers.
- Precipitated calcium carbonate (PCC) is generated as process waste during nitrophosphate fertilizer production, which contains TENORM.
- Activity concentration of the radionuclide in the TENORM was measured using gamma spectrometry and radiological hazard was derived from the measured activities.
- Radiological pollution in the environment from TENORM in the PCC has been addressed.
- Restricted application of the PCC dose not pose a significant radiological hazard.

Phenanthrene sorption to Chinese coal: Importance of coal’s geochemical properties

Casiao Yan, Yi Yang, Min Liu, Minghua Nie, John L. Zhou

Highlights
- 3D-macroporous biopolymer-coated hydroxyapatite (HA) foams as potential devices for the treatment of heavy metal ions.
- HA stable foams coated with biopolymers.
- Feasible advance in development of new, easy to handle and low cost water purifying methods.
Highlights

► Phen was chosen as the probe compound for determining the sorption of PAHs to a series of different Chinese coal samples. ► The combined partition and adsorption model yielded a better fit than the Freundlich isotherm. ► Compared to total carbon, BC might play more important role in the sorption of Phen to coal samples. ► Relationships between aromatic and aliphatic carbon contents and sorption parameters indicated the significance of aromatic and aliphatic carbon in the coal sorption behavior.

13 Reduction of excess sludge production in sequencing batch reactor through incorporation of chlorine dioxide oxidation

Guanghua Wang, Jun Sui, Huishan Shen, Shukun Liang, Xiangming He, Minju Zhang, Yizhong Xie, Lingyun Li, Yongyou Hu

14 Thermal explosion hazards on 18650 lithium ion batteries with a VSP2 adiabatic calorimeter

Can-Yong Jhu, Yih-Wen Wang, Chi-Min Shu, Jian-Chuang Chang, Hung-Chun Wu

15 Processed wastewater sludge for improvement of mechanical properties of concretes

Carlos Barrera-Díaz, Gonzalo Martínez-Barrera, Osman Gencel, Lina A. Bernal-Martínez, Witold Brostow

16 Studies on the selective Am\textsuperscript{3+} transport, irradiation stability and surface morphology of polymer inclusion membranes containing Cyanex-301 as carrier extractant

A. Bhattacharyya, P.K. Mohapatra, P.A. Hassan, V.K. Manchanda

17 Simultaneous absorption of NO\textsubscript{x} and SO\textsubscript{2} from flue gas with pyrolusite slurry combined with gas-phase oxidation of NO using ozone

Wei-yi Sun, Sang-lan Ding, Shan-shan Zeng, Shi-jun Su, Wen-ju Jiang

Graphical abstract

Variations of NO\textsubscript{x}/NO\textsubscript{2} removal efficiency and NO\textsubscript{x} oxidation rate in an immobilization absorption process of NO\textsubscript{x} and SO\textsubscript{2} removal with pyrolusite slurry.
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<td>18</td>
<td>An oxidation-absorption process for NOx and SO2 removal. ► Ozone oxidized NO into NO2 in gas phase. ► MnO2 in pyrolusite oxidized SO2 and NOx into MnSO4 and Mn(NO3)2 in liquid phase. ► SO2 and NOx removal efficiencies reach 90% and 80%. ► Mn extraction rate reach 85%.</td>
<td>Wenshu Tang, Qi Li, Shian Gao, Jian Ku Shang</td>
<td>► Ultrafine α-Fe2O3 nanoparticles were synthesized by the solvent thermal process. ► Combination of a large surface area and the existence of surface hydroxyl groups. ► Strong adsorption for both As(III) and As(V), especially at low equilibrium arsenic concentrations. ► Effectively removal of most arsenic contaminations from natural water samples without pre-treatments.</td>
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<td>A numerical method to determine the steady state distribution of passive contaminant in generic ventilation systems</td>
<td>Xianting Li, Xiaoliang Shao, Xiaojun Ma, Yuanhui Zhang, Hao Cai</td>
<td>► A versatile numerical method to determine the contaminant distribution of ventilation system with recirculation at steady state is proposed based on typical ventilation systems with accessibility of supply air (ASA) and accessibility of contaminant source (ACS). ► The proposed method has comparable accuracy with the experiment and numerical simulation to predict the contaminant distribution in ventilation systems with recirculation at steady state. ► The proposed method is much more time-saving than numerical iteration method when a large amount of cases are needed to calculate. The lumped parameter model does not take the information of the source location and flow pattern into account, so it may cause large discrepancy with the real values. ► The advantages of the proposed method in terms of accuracy, speed and versatility make it possible to be widely applied for complex ventilation systems with recirculation.</td>
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<td>Highly efficient visible light TiO2 photocatalyst prepared by sol–gel method at temperatures lower than 300 °</td>
<td>Desong Wang, Libin Xiao, Qingzhi Luo, Xueyan Li, Jing An, Yandong Duan</td>
<td>► Mesoporous anatase nano-TiO2 photocatalyst was synthesized by sol–gel method at lower temperature (≤300 °C). ► Its visible light photocatalytic activity is greatly higher than that of TiO2 (P-25) and its photocatalytic stability is excellent. ► Carbon self-doping and visible photosensitive organic groups result in the improvement of the visible light photocatalytic activity.</td>
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<td>Local characteristics of cross-unit contamination around high-rise building due to wind effect: Mean concentration and infection risk assessment</td>
<td>X.P. Liu, J.L. Niu, K.C.S. Kwok, J.H. Wang, B.Z. Li</td>
<td>► We examine cross-unit contamination around a high-rise building due to wind effect. ► The differences between open and closed window conditions are not significant. ► Mean concentration values decrease about one order of magnitude after window is open. ► Mean infection probabilities can up to 20% under closed-window condition. ► Infection risk calculated by instantaneous peak concentration value can be neglected.</td>
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<td>Enhanced sorption of radiocobalt from water by Bi(III) modified montmorillonite: A novel adsorbent</td>
<td>Zhiqiang Guo, Yuan Li, Shouwei Zhang, Haihong Niu, Zhesheng Chen, Jinzhang Xu</td>
<td>► Bi–Mt has higher surface area than Ca–Mt. ► The sorption of Co(II) on Bi–Mt is dependent on ionic strength and pH. ► The sorption of Co(II) on Bi–Mt is an spontaneous and endothermic process. ► Bi–Mt has good practical application potential in wastewater disposal.</td>
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<td>23</td>
<td>Extraction of metals from spent hydrotreating catalysts: Physico-mechanical pre-treatments and leaching stage</td>
<td>Francesco Ferella, Albena Ognyanova, Ida De Michielis, Giuliana Taglieri, Francesco Vegliò</td>
<td>► In this paper we studied pre-treatments of spent hydrotreating catalysts before hydrometallurgical processes aimed at the recovery of valuable metals (Ni, Co, V, and Mo). ► Pre-treatments, usually used in mining industry, are: attrition, flotation, and grain size separation. ► Influence of other pre-treatments were evaluated: preliminary grinding and roasting stage. ► Extraction of metals was tested using alkaline and acid leaching. ► Tests demonstrated that some pre-treatments are not able to concentrate metals, but others can improve the extraction of them in the leaching stage.</td>
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<td>Photocatalytic activities of Mo-doped Bi₂WO₆ three-dimensional hierarchical microspheres</td>
<td>Xu Chun Song, Yi Fan Zheng, Rong Ma, Yao Yuan Zhang, Hao Yong Yin</td>
<td>► The Mo-doped Bi₂WO₆ 3D hierarchical microspheres have been synthesized by a hydrothermal route. ► The Mo-doped Bi₂WO₆ exhibited the high photocatalytic activity for the decomposition of RhB. ► The effects of Mo-doping concentrations on the photocatalytic activity were discussed. ► Defects and the band gap decreased of Bi₂WO₆ provides a possibility for enhancing the activity.</td>
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<td>Probing metabolic stability of CdSe nanoparticles: Alkaline extraction of free cadmium from liver and kidney samples of rats exposed to CdSe nanoparticles</td>
<td>Zikri Arslan, Mehmet Ates, Wanaki McDuffy, M. Sabri Agachan, Ibrahim O. Farah, W. William Yu, Anthony J. Bednar</td>
<td>► Separation of Cd is examined from tissues containing CdSe nanoparticles (NPs). ► TMAH affords extraction of free Cd in tissues without deteriorating intact NPs. ► Thiol-capped CdSe NPs degrade in the body to release free Cd. ► UV light accelerates NP degradation resulting in elevated Cd levels in the body.</td>
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<td>Effect of sulfide concentration on the location of the metal precipitates in inversed fluidized bed reactors</td>
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<td>27</td>
<td>Development of graded Ni–YSZ composite coating on Alloy 690 by Pulsed Laser Deposition technique to reduce hazardous metallic nuclear waste inventory</td>
<td>Pranesh Sengupta, Detlef Rogalla, Hans Werner Becker, Gautam Kumar Dey, Sumit Chakraborty</td>
<td>► Pre-mature failure of vitrification furnaces not only delays nuclear waste immobilization process but also generates new type of wastes. ► To prevent this, Ni–YSZ compositionally graded coating has been developed for Alloy 690 through Pulsed Laser Deposition technique. ► Detail characterization of the coating and its behavior under simulated plant condition identifies Ni–YSZ composite coating as a suitable diffusion barrier material.</td>
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<td>Characteristics and the behavior in electrostatic precipitators of high-alumina coal fly ash from the Jungar power plant, Inner Mongolia, China</td>
<td>Liqiang Qi, Yongtao Yuan</td>
<td>► Chemical and mineralogical compositions of Jungar coal fly ash were reported. ► The size distribution, resistivity and cohesive force of fly ash were experimented. ► V–I curve of high-alumina fly ash under operating ESPs was explained. ► The mechanism of high-alumina fly ash escaping from ESPs was discussed.</td>
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<td>A combination of bioleaching and bioprecipitation for deep removal of contaminating metals from dredged sediment</td>
<td>Di Fang, Ruichang Zhang, Lixiang Zhou, Jie Li</td>
<td>► Bioleaching-bioprecipitation can deeply cleanup sediment-borne metal contaminants. ► Bioleaching results in a sufficient solubilisation of sediment-borne metals. ► Bioprecipitation removes most of solubilised metals from sediment leachate at pH 3.7. ► Bioremoval of soluble Zn, Cu and Cr is due to the formation of ZnS, Cu2S and CrOOH. ► Alkalization of bioleached sediment by Ca(OH)2 excludes the risk of re-acidification.</td>
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<td>Microencapsulation of phosphogypsum into a sulfur polymer matrix: Physico-chemical and radiological characterization</td>
<td>Félix A. López, Manuel Gázquez, Francisco José Alguacil, Juan Pedro Bolívar, Irene García-Díaz, Israel López-Coto</td>
<td>► Microencapsulation of phosphogypsum residues into a sulfur polymer matrix. ► Inertization of a waste material. ► Radiological characterization of the as built new material (phosphogypsum plus sulfur polymer matrix).</td>
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<td>31</td>
<td>Isotherm, thermodynamic, kinetics and adsorption mechanism studies of methyl orange by surfactant modified silkworm exuviae</td>
<td>Hao Chen, Jie Zhao, Junyong Wu, Guoliang Dai</td>
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<td>32</td>
<td>Silica materials recovered from photonic industrial waste powder: Its extraction, modification, characterization and application</td>
<td>Liang-Yi Lin, Jien-Ting Kuo, Hsunling Bai</td>
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Highlights
► Photonic industrial waste powder was recovered into NaF and silica precursor. ► The extracted silica precursor was used for producing mesoporous MCM-41 material. ► MCM-41 synthesized from photonic waste powder can be a cost-effective adsorbent for CO₂ capture.

Speciation of selenium in groundwater: Seasonal variations and redox transformations
Original Research Article
Pages 263-269
A. Ramesh Kumar, P. Riyazuddin

Highlights
► Selenium(VI) was the predominant species of Se present in groundwater. ► Groundwater recharge increased Se mobilization. ► Dissolved oxygen and redox potential control the mobilization of soil selenium. ► Shallow groundwater is susceptible for more selenium enrichment than deeper ones.

Enhanced tolerance and remediation of anthracene by transgenic tobacco plants expressing a fungal glutathione transferase gene
Original Research Article
Pages 270-276
Prachy Dixit, Prasun K. Mukherjee, Pramod D. Sherkhane, Sharad P. Kale, Susan Eapen

Highlights
► Transgenic plants expressing a TvGST gene were tested for tolerance, uptake and degradation of anthracene. ► Transgenic plants were more tolerant to anthracene and take up more anthracene from soil and solutions compared to control plants. ► Using in vitro T₁ seedlings, we showed that anthracene—a three fused benzene ring compound was phytodegraded to naphthalene derivatives, having two benzene rings. ► This is the first time that a transgenic plant was shown to have the potential to phytodegrade anthracene.

Effective heavy metal removal from aqueous systems by thiol functionalized magnetic mesoporous silica
Original Research Article
Pages 277-283
Guoliang Li, Zongshan Zhao, Jiyan Liu, Guibin Jiang

Adsorptive behaviour of mercury on algal biomass: Competition with divalent cations and organic compounds
Original Research Article
Pages 284-291
Leticia Carro, José L. Barriada, Roberto Herrero, Manuel E. Sastre de Vicente

Aqueous two-phase systems: A new approach for the determination of p-aminophenol
Original Research Article
Pages 292-298
Guilherme Dias Rodrigues, Leandro Rodrigues de Lemos, Pamela da Rocha Patrício, Luis Henrique Mendes da Silva, Maria do Carmo Hespanhol da Silva

Interaction of silver nanoparticles (SNPs) with bacterial extracellular proteins (ECPs) and its adsorption isotherms and kinetics
Original Research Article
Pages 299-306
S. Sudheer Khan, P. Srivatsan, N. Vaishnavi, Amitava Mukherjee, N. Chandrasekaran

Highlights
► Bacterial extracellular proteins stabilize the silver nanoparticles. ► Adsorption process varies with pH and salt concentration of the interaction medium. ► Adsorption process was strongly influenced by surface charge. ► Adsorption equilibrium isotherms was fitted well by the Freundlich model. ► Kinetics of adsorption was fitted by pseudo-second-order.

39  A new model of repulsive force in eddy current separation for recovering waste toner cartridges
Jujun Ruan, Zhenming Xu

Highlights
► New model of repulsive force in eddy current separation containing unreported impact factor was established in this paper. ► Experiment results indicate this model is suitable to guide the eddy current separation for recovering waste toner cartridges. ► Compared to other similar models, this model has the advantage of accuracy in guiding eddy current separation.

40  Formaldehyde removal by potted plant–soil systems
Zhongjun Xu, Li Wang, Haiping Hou

Highlights
► We used dynamic chambers to investigate formaldehyde removal by plant-soil systems. ► It is confirmed that some plant-soil systems can intensively remove formaldehyde. ► The high activities of botanic and microbial enzymes contribute to the removal. ► This insight conduces to develop biodegradation for pollutants from air.

41  Removal of antimicrobials using advanced wastewater treatment
Ivan Senta, Marin Matošić, Helena Korajlija Jakopović, Senka Teržić, Josip Ćurko, Ivan Mijatović, Marijan Ahel

Highlights
► Removal of antimicrobials from highly contaminated wastewater, applying a combination of membrane bioreactors (MBRs), nanofiltration, reverse osmosis and ozonation, was studied. ► Microbial transformation represented the main removal mechanism in MBR treatment, however the removal of macrolides, fluoroquinolones and trimethoprim was incomplete. ► High removal rates were achieved by filtration techniques but the problem associated with highly contaminated concentrate remains a major problem. ► Ozonation represents an efficient complementary technique but a more detailed characterization of the formed ozonation products is needed.

42  Definition of a short-cut methodology for assessing earthquake-related Na-Tech risk
Valentina Busini, Enrico Marzo, Andrea Callioni, Renato Rota

Highlights
► In industrial sites located in natural hazard-prone areas technological accidents may be triggered by natural events, generating the so-called Na-Tech accidents. ► In this paper, a qualitative screening methodology for assessing the earthquake Na-Tech risk has been developed with the aim of identifying which situations deserve a much more expensive Quantitative Risk Analysis. ► The simple procedure developed, which summarizes in a suitable Key Hazard Indicator the Na-Tech risk level, has been validated by comparing its results with those of some Quantitative Risk Analyses involving also Na-Tech events and previously presented in the literature.

43  Hydrogen substitutes for the in situ generation of H2O2: An application in the Fenton reaction
Mohammad S. Yalfani, Sandra Contreras, Francesc Medina, Jesus E. Suelañas

Highlights
► In industrial sites located in natural hazard-prone areas technological accidents may be triggered by natural events, generating the so-called Na-Tech accidents. ► In this paper, a qualitative screening methodology for assessing the earthquake Na-Tech risk has been developed with the aim of identifying which situations deserve a much more expensive Quantitative Risk Analysis. ► The simple procedure developed, which summarizes in a suitable Key Hazard Indicator the Na-Tech risk level, has been validated by comparing its results with those of some Quantitative Risk Analyses involving also Na-Tech events and previously presented in the literature.
Graphical abstract

Highlights
► H₂O₂ is catalytically generated for Fenton process using H₂ substitutes and O₂. ► Formic acid, hydrazine and hydroxylamine are used as H₂ substitutes. ► Halide ions are not able to promote the efficiency of the process. ► Formic acid shows a remarkable performance in acidic conditions. ► For neutral wastewaters, hydroxylamine is able to achieve a better efficiency.

Kinetics of 2,6-dimethylaniline oxidation by various Fenton processes
Original Research Article
Pages 347-353
Nalinrut Masomboon, Chavalit Ratanatamskul, Ming-Chun Lu

Highlights
► The kinetics of 2,6-dimethylaniline degradation with Fenton processes was investigated. ► This study attempted to eliminate the interferences through initial rate techniques. ► The overall rate equations for 2,6-DMA degradation by Fenton processes were proposed.

In situ degradation of phenol and promotion of plant growth in contaminated environments by a single Pseudomonas aeruginosa strain
Original Research Article
Pages 354-360
Yujing Wang, Jing Song, Wei Zhao, Xiaoli He, Jun Chen, Ming Xiao

Highlights
► We obtained a single strain and found that the role of the strain is important in biodegradation. ► Inoculation of the single strain resulted in corn growth promotion and in situ phenol degradation. ► The strain can stimulate corn growth and reduce phenol concentration in phenol-containing water.

NO treated TiO₂ as an efficient visible light photocatalyst for NO removal
Original Research Article
Pages 361-367
Zhihui Ai, Linli Zhu, Shuncheng Lee, Lizhi Zhang

Highlights
► We reported that nitrogen doped TiO₂ could be achieved via thermal treatment of Degussa P25 TiO₂ in NO atmosphere directly (P25–NO). ► In comparison with that of P25, the P25–NO exhibited significantly enhanced photocatalytic activities under visible light irradiation (λ > 420 nm) for gaseous NO removal. ► We proposed a possible mechanism for the enhanced visible light driven photocatalytic oxidation process over the interstitial N doping P25 samples.

Gel-hydrothermal synthesis of carbon and boron co-doped TiO₂ and evaluating its photocatalytic activity
Original Research Article
Pages 368-373
Yongmei Wu, Mingyang Xing, Jinlong Zhang

Graphical abstract
Highlights

► Carbon and boron co-doped TiO₂ photocatalysts with larger surface area were prepared firstly by the gel-hydrothermal method. ► Surface coke carbon photosensitization effect is responsible for its high photocatalytic activity in the visible light irradiation. ► B–C synergistic effects play the major role in its effective photo-degradation of 2,4-DCP under the visible light.

48 Exposure of Hong Kong residents to PBDEs and their structural analogues through market fish consumption

Original Research Article
Pages 374-380
Hong-Sheng Wang, Jun Du, Ka-Lok Ho, Ho-man Leung, Michael Hon-Wah Lam, John P. Giesy, Chris Kong-Chu Wong, Ming-Hung Wong

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Highlights

► Dietary intake of PBDEs via fish consumption by Hong Kong residents was greater than many developed countries. ► Concentrations of OH-BDEs and BRPs were 10–100-fold less than those of PBDEs in fish. ► This is the first report to estimate the dietary intake of MeO/OH-BDEs and BRPs via fish consumption.

49 Using response surface methodology to assess the effects of iron and spent mushroom substrate on arsenic phytotoxicity in lettuce (Lactuca sativa L.)

Original Research Article
Pages 381-387
Namin Koo, Hun-Je Jo, Sang-Hwan Lee, Jeong-Gyu Kim

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Highlights

► As in soils obviously reduces the root growth of lettuce. ► Incorporation of Fe in artificial soils induced EC₅₀ of As to lettuce root elongation. ► SMS increased lettuce root elongation in both As-treated and non-As treated soils. ► However, SMS also decreased EC₅₀ of As via its interaction with Fe. ► Response surface model fits for interpreting interactions of factors in soils.

50 Phytoremediatory effect and growth of two species of Ocimum in endosulfan polluted soil

Original Research Article
Pages 388-392

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Highlights

► Endosulfan is a toxic environment found in soils. ► Liperoxidation and growth of Ocimum spp. in soil without endosulfan was studied. ► Endosulfan does not alter Ocimum spp growth rate. ► Soil with O. basilicum showed less endosulfan content than control at 30 days. ► Transplant to endosulfan-polluted soil increases lipid peroxidation in O. basilicum.

51 Environmental optimization of chromium recovery from tannery sludge using a life cycle assessment approach

Original Research Article
Pages 393-401
Eylem Kiliç, Rita Puig, Grau Baquero, Joaquim Font, Selime Çolak, Deniz Gürler

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Highlights

► Chromium recovery from tannery sludge was environmentally evaluated by means of LCA. ► Energy and chemical use increase the environmental impact of end-of-pipe treatment.
Speciation of heavy metals by modified BCR sequential extraction procedure in different depths of sediments from Sungai Buloh, Selangor, Malaysia

Original Research Article
Pages 402-410
Keivan Nemati, Nor Kartini Abu Bakar, Mhd. Radzi Abas, Elham Sobhanzadeh

Highlights

► A BCR sequential extraction procedure was applied for measurement of heavy metals in Sungai Buloh sediments in different depths. ► The amounts of CF and percentage of RAC was measured in this study too. ► Highest CF was obtained for Cd, Co, Pb and Zn in these samples. ► Zn at S3 and Cd at S3–S7 showed a high risk for the sediment samples. There were no elements of very high risk conditions in the selected samples.

Diclofenac photodegradation under simulated sunlight: Effect of different forms of nitrogen and Kinetics

Original Research Article
Pages 411-418
Nan Zhang, Guoguang Liu, Haijin Liu, Yingling Wang, Zhanwei He, Gang Wang

Highlights

► We study the effects of the different forms of nitrogen interaction on the photodegradation DCF under simulated sunlight in the aquatic environment for the first time. ► The kinetic model for DCF degradation was investigated in detail. ► And we first proposed the self-sensitization of DCF.

Analytical solutions for exposures and toxic loads in well-mixed shelters in support of shelter-in-place assessments

Short Communication
Pages 419-422
S.T. Parker, C.J. Coffey

Method is environmentally better in case of higher chromium concentration in sludge. Anaerobic digestion of tannery sludge considerably improved the environmental profile.