



QK2039869

方知库
Eco-Environmental
Knowledge Web

环境科学

ENVIRONMENTAL SCIENCE

ISSN 0250-3301 CODEN HCKHDV

HUANJING KEXUE

■ 主办 中国科学院生态环境研究中心

■ 出版 科学出版社



2020

Vol.41 No.9

第41卷 第9期

目 次

2020 年天津市两次重污染天气污染特征分析	肖致美, 徐虹, 蔡子颖, 李鹏, 刘彬, 元洁, 郑乃源, 唐邈, 陈魁, 邓小文(3879)
基于高分辨率 MARGA 分析成都市 PM _{2.5} 中水溶性离子污染特征	尹寒梅, 陈军辉, 冯小琼, 姜涛, 钱骏, 刘政(3889)
宿迁市 PM _{2.5} 中水溶性无机离子的季节特征和来源分析	 马红璐, 赵欣, 陆建刚, 王辉, 许纯领, 欧阳琰, 朱新胜, 殷堂兵, 漆丹, 陆亚秋, 汪玖阳, 陆声兴(3899)
鼎湖山大气颗粒物中 OC 与 EC 的浓度特征及粒径分布	李安娜, 温天雪, 华维, 杨员, 孟泽, 胡波, 辛金元(3908)
鞍山市道路扬尘碳组分特征及来源解析	林孜, 姬亚芹, 林宇, 国纪良, 马妍, 赵静琦(3918)
西安市冬季 PM _{2.5} 中 WSOC 的光谱特性和来源解析	杨毅, 张亚楠, 刘焕武, 田萍萍, 李亚飞, 雷颖, 王一博(3924)
长三角地区气溶胶光学性质与新粒子生成观测	 杜盈盈, 陈军, 张家洛, 甘桂城, 刘瑜存, 苏明旭, 楼晟荣, 周敏, 陶士康, 乔利平(3932)
连云港市挥发性有机化合物的组分特征及来源解析	崔金梦, 王体健, 李秋潼, 董立文, 黄丛吾, 曹云攀(3941)
成都市城区大气 VOCs 季节污染特征及来源解析	王成辉, 陈军辉, 韩丽, 徐晨曦, 王波, 李英杰, 刘政, 钱骏(3951)
德州市夏季臭氧敏感性特征及减排方案	严茹莎(3961)
超低改造下中国火电排放清单及分布特征	屈加豹, 王鹏, 伯鑫, 薛晓达, 董广霞, 崔磊, 康明雄, 王彤, 汤铃, 朱法华, 李时蓓(3969)
浙江省人为源氨排放清单建立及分布特征	赵睿东, 于兴娜, 侯新红, 沈丽(3976)
垃圾焚烧烟气中二噁英控制技术的评估与筛选	赵思岚, 奚鹏飞, 郭凤艳, 邓双, 贾建丽(3985)
兰州市两场典型降水事件稳定同位素特征及其水汽来源	韩婷婷, 张明军, 王圣杰, 杜勤勤, 马转转, 郭蓉, 曹晏凤(3993)
然乌湖流域地表水水化学特征及控制因素	张涛, 王明国, 张智印, 刘廷, 何锦(4003)
河套灌区地下水化学演变特征及形成机制	崔佳琪, 李仙岳, 史海滨, 孙亚楠, 安海军, 邢进平(4011)
石期河流域地下水化学特征及物质来源分析	李笑, 于爽, 李亮, 郭永丽(4021)
长江中下游湖泊水体氮磷比时空变化特征及其影响因素	季鹏飞, 许海, 詹旭, 朱广伟, 邹伟, 朱梦圆, 康丽娟(4030)
2016~2017 年长荡湖流域湖库系统营养盐时空分布机制分析	李新艳, 李恒鹏, 姜三元, 马培, 赖锡军, 邓建才, 陈东强, 耿建伟(4042)
菹草对湖泊水质及浮游植物群落结构的影响	康丽娟, 许海, 邹伟, 朱广伟, 朱梦圆, 季鹏飞, 陈洁(4053)
金泽水库库区细菌群落构建过程与关键驱动因子分析	刘明坤, 童俊, 朱慧峰, 白晓慧(4062)
典型氟工业周边河流沉积物中全(多)氟化化合物的分布特征	孙琳婷, 赵祯, 唐建辉(4069)
微塑料对河水抗生素抗性基因的影响	周昕原, 王言仔, 苏建强, 黄福义(4076)
莲花水库水体中抗生素污染特征及生态风险评价	廖杰, 魏晓琴, 肖燕琴, 李青松, 范洪勇, 刘学军, 庄马展, 刘超翔(4081)
拟柱孢藻生长及碱性磷酸酶活性对不同磷浓度和磷形态响应的株系间差异	叶金梅, 赵莉, 罗旭, 彭亮, 雷腊梅(4088)
奶水河湿地植物作用及调水水质响应模拟	李亚娟, 杜彦良, 毕二平, 王亮, 陈翠柏(4095)
浅基质层干植草沟运行效果的现场实验	张佳炜, 李田, 张庭秀(4105)
海绵城市地块汇水区颗粒污染物的传输	李佳, 谢文霞, 姜智绘, 单溪环, 廖云杰, 赵洪涛, 李叙勇(4113)
天然黄铁矿吸附去除水中 Sb(V): 性能与机制	石松, 吴乾元, 李新正, 黄满红(4124)
过硫酸盐氧化处理含苯磺酸废水	章晋门, 卢钧, 刘晓琛, 陈泉源(4133)
温度对城市污水厌氧生物滤池运行效果与菌群结构的影响	刘智斌, 刘秀红, 周桐, 章世勇, 李健敏, 杨庆(4141)
ABR-MBR 耦合工艺启动及优化反硝化除磷性能	缪新年, 汪倩, 郭凯成, 刘文如, 沈耀良(4150)
低温下全自养脱氮颗粒污泥适应低基质效能	刘雨馨, 王建芳, 钱飞跃, 陈倩苗, 乔伟, 沈聪(4161)
雄安新区土壤重金属地球化学监测关键问题探讨	郭志娟, 周亚龙, 杨峰, 赵传冬, 成杭新, 孔牧, 彭敏(4169)
基于土壤重金属及 PAHs 来源的人体健康风险定量评价: 以北京某工业污染场地为例	 吴志远, 张丽娜, 夏天翔, 贾晓洋, 李慧颖, 王世杰(4180)
基于乡镇尺度的西南重金属高背景区土壤重金属生态风险评价	 张富贵, 彭敏, 王惠艳, 马宏宏, 徐仁廷, 成晓梦, 侯召雷, 陈子万, 李括, 成杭新(4197)
云南兰坪铅锌矿区优势植物重金属富集特性及应用潜力	张龙, 张云霞, 宋波, 吴勇, 周子阳(4210)
水培试验下水稻 Pb 吸收累积关键生育期	胡雨丹, 周航, 辜娇峰, 霍洋, 邓鹏辉, 魏宾钰, 刘俊, 廖柏寒(4218)
田间条件下养分调控八宝景天 Cd 修复效率	郭俊梅, 杨俊兴, 杨军, 郑国砥, 周小勇, 陈同斌, 卞建林, 孟晓飞, 李玉峰(4226)
桉树枝条生物炭输入对桂北桉树人工林酸化土壤的作用效果	 段春燕, 沈育伊, 徐广平, 滕秋梅, 张德楠, 何成新, 张中峰, 周龙武, 孙英杰(4234)
秸秆直接还田和炭化还田对红壤酸度、养分和交换性能的动态影响	杨彩迪, 卢升高(4246)
土壤微生物群落结构对生活源和工业源再生水灌溉的差异化响应	王燕, 程东会, 檀文炳, 余红, 席北斗, 姜永海, 党秋玲(4253)
粪肥和有机肥施用对稻田土壤微生物群落多样性影响	理鹏, 吴建强, 沙晨燕, 叶春梅, 黄沈发(4262)
松花江下游沿江湿地土地利用变化对土壤细菌群落多样性的影响	张拓, 徐飞, 怀宝东, 杨雪, 隋文志(4273)
黄土高原草地土壤细菌群落结构对于降水变化的响应	李娜, 王宝荣, 安韶山, 焦峰, 黄倩(4284)
土地利用方式对会仙岩溶湿地土壤真菌群落和功能类群的影响	程跃扬, 靳振江, 王晓彤, 贾远航, 袁武, 周军波(4294)
黑土真菌群落互作及其与梯度有机质碳分子结构的关系	尚秋彤, 黄瑞林, 倪浩为, 隋跃宇, 孙波, 梁玉婷(4305)
贵州茂兰喀斯特森林不同演替下土壤真核微生物多样性	王显, 龙健, 李娟, 刘灵飞, 廖洪凯, 李宜蓉, 杨睿(4314)
玉米秸秆生物炭固化细菌对镉吸附	刘玉玲, 朱虎成, 彭鸥, 李丹阳, 杨蕊嘉, 彭晶, 铁柏清(4322)
无机态氮素转化机制及水土体氮源识别方法	梁杏, 孙立群, 张鑫, 张洁, 付鹏宇(4333)
《环境科学》征订启事(4061) 《环境科学》征稿简则(4132) 信息(4233, 4293, 4304)	

CONTENTS

Characterization of Two Heavy Pollution Episodes in Tianjin in 2020	XIAO Zhi-mei, XU Hong, CAI Zi-ying, <i>et al.</i> (3879)
Analysis of Characteristics of Water-soluble Ions in PM _{2.5} in Chengdu Based on the MARGA	YIN Han-mei, CHEN Jun-hui, FENG Xiao-qiong, <i>et al.</i> (3889)
Seasonal Characteristics and Source Analysis of Water-soluble Inorganic Ions in PM _{2.5} in Suqian City	MA Hong-lu, ZHAO Xin, LU Jian-gang, <i>et al.</i> (3899)
Characterization and Size Distribution of Carbonaceous Aerosols at Mountain Dinghu	LI An-na, WEN Tian-xue, HUA Wei, <i>et al.</i> (3908)
Characteristics and Source Apportionment of Carbon Components in Road Dust in Anshan	LIN Zi, JI Ya-qin, LIN Yu, <i>et al.</i> (3918)
Spectral Characteristics and Source Analysis of WSOC of PM _{2.5} in Winter of Xi'an	YANG Yi, ZHANG Ya-nan, LIU Huan-wu, <i>et al.</i> (3924)
Observation of Aerosol Optical Properties and New Particle Formation in the Yangtze River Delta	DU Ying-ying, CHEN Jun, ZHANG Jia-luo, <i>et al.</i> (3932)
Component Characteristics and Source Appointment of Volatile Organic Compounds in Lianyungang City	CUI Jin-meng, WANG Ti-jian, LI Qiu-tong, <i>et al.</i> (3941)
Seasonal Pollution Characteristics and Analysis of the Sources of Atmospheric VOCs in Chengdu Urban Area	WANG Cheng-hui, CHEN Jun-hui, HAN Li, <i>et al.</i> (3951)
Ozone Sensitivity Analysis and Emission Controls in Dezhou in Summer	YAN Ru-sha (3961)
Inventory and Distribution Characteristics of China's Thermal Power Emissions Under Ultra-Low Reconstruction	QU Jia-bao, WANG Peng, BO Xin, <i>et al.</i> (3969)
Establishment and Spatial Distribution of Anthropogenic Ammonia Emission Inventory in Zhejiang Province	ZHAO Rui-dong, YU Xing-na, HOU Xin-hong, <i>et al.</i> (3976)
Evaluation and Screening of Dioxin Control Technology in Waste Incineration Flue Gas	ZHAO Si-lan, XI Peng-fei, GUO Feng-yan, <i>et al.</i> (3985)
Characteristics of Stable Isotopes and Moisture Sources of Two Typical Precipitation Events in Lanzhou City	HAN Ting-ting, ZHANG Ming-jun, WANG Sheng-jie, <i>et al.</i> (3993)
Hydrochemical Characteristics and Possible Controls of the Surface Water in Ranwu Lake Basin	ZHANG Tao, WANG Ming-guo, ZHANG Zhi-yin, <i>et al.</i> (4003)
Chemical Evolution and Formation Mechanism of Groundwater in Hetao Irrigation Area	CUI Jia-qi, LI Xian-yue, SHI Hai-bin, <i>et al.</i> (4011)
Chemical Characteristics of Groundwater and Material Sources Analysis in Shiqi River Basin	LI Xiao, YU Shi, LI Liang, <i>et al.</i> (4021)
Spatial-temporal Variations and Driving of Nitrogen and Phosphorus Ratios in Lakes in the Middle and Lower Reaches of Yangtze River	JI Peng-fei, XU Hai, ZHAN Xu, <i>et al.</i> (4030)
Spatiotemporal Variations in Nutrient Loads in River-lake System of Changdang Lake Catchment in 2016-2017	LI Xin-yan, LI Heng-peng, JIANG San-yuan, <i>et al.</i> (4042)
Influence of <i>Potamogeton crispus</i> on Lake Water Environment and Phytoplankton Community Structure	KANG Li-juan, XU Hai, ZOU Wei, <i>et al.</i> (4053)
Phylogenetic Processes and Key Driving Factors of Bacterial Communities in Jinze Reservoir	LIU Ming-kun, TONG Jun, ZHU Hui-feng, <i>et al.</i> (4062)
Distribution Characteristics of Per-/polyfluoralkyl Substances in River Sediments Around Typical Fluorine Industrial Parks	SUN Lin-ting, ZHAO Zhen, TANG Jian-hui (4069)
Microplastics-Induced Shifts of Diversity and Abundance of Antibiotic Resistance Genes in River Water	ZHOU Xin-yuan, WANG Yan-zi, SU Jian-qiang, <i>et al.</i> (4076)
Pollution Characteristics and Risk Assessment of Antibiotics in Lianhua Reservoir	LIAO Jie, WEI Xiao-qin, XIAO Yan-qin, <i>et al.</i> (4081)
Intraspecific Variation in Growth and Alkaline Phosphatase Activity of <i>Cylindrospermopsis raciborskii</i> Strains in Response to Different Phosphorus Concentrations and Sources	YE Jin-mei, ZHAO Li, LUO Xu, <i>et al.</i> (4088)
Simulation of Water Quality Response of Guishui River Wetland Plants and Water Diversion	LI Ya-juan, DU Yan-liang, BI Er-ping, <i>et al.</i> (4095)
Performance Assessment of Field-scale Dry Grass Swale with Shallow Substrate Layer	ZHANG Jia-wei, LI Tian, ZHANG Ting-xiu (4105)
Transition of Particulate Pollutant in the Parcel-based Catchment of Sponge City	LI Jia, XIE Wen-xia, JIANG Zhi-hui, <i>et al.</i> (4113)
Adsorption of Sb(V) in Water by Natural Pyrite: Performance and Mechanism	SHI Song, WU Qian-yuan, LI Xin-zheng, <i>et al.</i> (4124)
Treatment of Wastewater Containing Naphthalene Sulfonic Acid by Persulfate Oxidation	ZHANG Jin-men, LU Jun, LIU Xiao-chen, <i>et al.</i> (4133)
Effect of Temperature on Performance and Microbial Community Structure of Anaerobic Biofilter-Treated Domestic Wastewater	LIU Zhi-bin, LIU Xiu-hong, ZHOU Tong, <i>et al.</i> (4141)
Start-up and Optimization of Denitrifying Phosphorus Removal in ABR-MBR Coupling Process	MIAO Xin-nian, WANG Qian, GUO Kai-cheng, <i>et al.</i> (4150)
Adaptability of Completely Autotrophic Nitrogen Removal over Granular Sludge to Low-Strength at Low Temperature	LIU Yu-xin, WANG Jian-fang, QIAN Fei-yue, <i>et al.</i> (4161)
Discussion on Key Issues of Geochemical Monitoring of Soil Heavy Metal in Xiong'an New District	GUO Zhi-juan, ZHOU Ya-long, YANG Zheng, <i>et al.</i> (4169)
Quantitative Assessment of Human Health Risks Based on Soil Heavy Metals and PAHs Sources;Take a Polluted Industrial Site of Beijing As an Example	WU Zhi-yuan, ZHANG Li-na, XIA Tian-xiang, <i>et al.</i> (4180)
Ecological Risk Assessment of Heavy Metals at Township Scale in the High Background of Heavy Metals, Southwestern, China	ZHANG Fu-gui, PENG Min, WANG Hui-yan, <i>et al.</i> (4197)
Potential of Accumulation and Application of Dominant Plants in Lanping Lead-zinc Mine, Yunnan Province	ZHANG Long, ZHANG Yun-xia, SONG Bo, <i>et al.</i> (4210)
Key Growth Stage of Pb Accumulation in Rice Through a Hydroponic Experiment with Pb Stress	HU Yu-dan, ZHOU Hang, GU Jiao-feng, <i>et al.</i> (4218)
Effect of Nutrient Regulation and Control on Cd Accumulation Efficiency of <i>Hylotelephium spectabile</i> Under Field Conditions	GUO Jun-mei, YANG Jun-xing, YANG Jun, <i>et al.</i> (4226)
Effects of <i>Eucalyptus</i> Branches Biochar Application on Soil Physicochemical Properties of Acidified Soil in a <i>Eucalyptus</i> plantation in Northern Guangxi	DAUN Chun-yan, SHEN Yu-yi, XU Guang-ping, <i>et al.</i> (4234)
Dynamic Effects of Direct Returning of Straw and Corresponding Biochar on Acidity, Nutrients, and Exchangeable Properties of Red Soil	YANG Cai-di, LU Sheng-gao (4246)
Different Responses of Soil Microbial Community Structure to Irrigation with Treated Wastewater from Domestic and Industrial Sources	WANG Yan, CHENG Dong-hui, TAN Wen-bing, <i>et al.</i> (4253)
Effects of Manure and Organic Fertilizer Application on Soil Microbial Community Diversity in Paddy Fields	LI Peng, WU Jian-qiang, SHA Chen-yan, <i>et al.</i> (4262)
Effects of Land Use Changes on Soil Bacterial Community Diversity in the Riparian Wetland Along the Downstream of Songhua River	ZHANG Tuo, XU Fei, HUAI Bao-dong, <i>et al.</i> (4273)
Response of Soil Bacterial Community Structure to Precipitation Change in Grassland of Loess Plateau	LI Na, WANG Bao-rong, AN Shao-shan, <i>et al.</i> (4284)
Effect of Land-use on Soil Fungal Community Structure and Associated Functional Group in Huixian Karst Wetland	CHENG Yue-yang, JIN Zhen-jiang, WANG Xiao-tong, <i>et al.</i> (4294)
Interactions of Fungi Community and Relationship with the Carbon Structure in Arable Mollisols with Gradient Organic Matter Content	SHANG Qiu-tong, HUANG Rui-lin, NI Hao-wei, <i>et al.</i> (4305)
Diversity of Soil Eukaryotic Microbes in Different Succession Stages in Maolan Karst Forest of Guizhou	WANG Xian, LONG Jian, LI Juan, <i>et al.</i> (4314)
Adsorption of Cadmium and Arsenic by Corn Stalk Biochar Solidified Microorganism	LIU Yu-ling, ZHU Hu-cheng, PENG Ou, <i>et al.</i> (4322)
Mechanism of Inorganic Nitrogen Transformation and Identification of Nitrogen Sources in Water and Soil	LIANG Xing, SUN Li-qun, ZHANG Xin, <i>et al.</i> (4333)

《环境科学》第七届编辑委员会

主 编：赵进才

副主编：郝吉明 贺 泓 贺克斌 彭永臻 陶 澍 王金南 张远航 朱利中

编 委：安太成 陈宝梁 陈春城 陈景文 陈 威 高宝玉 郝吉明 郝郑平

何品晶 贺 泓 贺纪正 贺克斌 黄 霞 黄 耀 姜 林 李发生

李芳柏 林 璋 刘 鸿 刘双江 刘 毅 刘志培 欧阳钢锋 彭永臻

强志民 全 燮 桑 楠 史培军 孙红文 陶 澍 王金南 王凯军

王祥科 王晓昌 王绪绪 韦朝海 余 刚 曾光明 张礼知 张晓健

张远航 赵进才 周东美 周 琪 周启星 朱东强 朱利中 祝凌燕

朱 彤 朱永官

(以上按姓氏拼音排序)

编辑部主任：李 林

环 境 科 学

(HUANJING KEXUE)

(月刊 1976年8月创刊)

2020年9月15日 第41卷 第9期

ENVIRONMENTAL SCIENCE

(Monthly Started in 1976)

Vol. 41 No. 9 Sep. 15, 2020

主 管	中国科学院	Superintended	by	Chinese Academy of Sciences
主 办	中国科学院生态环境研究中心	Sponsored	by	Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences
协 办	(以参加先后为序) 北京市环境保护科学研究院 清华大学环境学院	Co-Sponsored	by	Beijing Municipal Research Institute of Environmental Protection School of Environment, Tsinghua University
主 编	赵进才	Editor-in-Chief		ZHAO Jin-cai
编 辑	《环境科学》编辑委员会 北京市2871信箱(海淀区双清路18号, 邮政编码:100085) 电话:010-62941102, 010-62849343 传真:010-62849343 E-mail: hjkx@rcees.ac.cn http://www.hjkx.ac.cn	Edited	by	The Editorial Board of Environmental Science (HUANJING KEXUE) P. O. Box 2871, Beijing 100085, China Tel: 010-62941102, 010-62849343; Fax: 010-62849343 E-mail: hjkx@rcees.ac.cn http://www.hjkx.ac.cn
出 版	科 学 出 版 社 北京东黄城根北街16号 邮政编码:100717	Published	by	Science Press 16 Donghuangchenggen North Street, Beijing 100717, China
印 刷 装 订	北京宝昌彩色印刷有限公司	Printed	by	Beijing Baochang Color Printing Co., Ltd.
发 行	科 学 出 版 社 电话:010-64017032 E-mail: journal@mail.sciencep.com	Distributed	by	Science Press Tel: 010-64017032 E-mail: journal@mail.sciencep.com
订 购 处	全国各地邮电局	Domestic		All Local Post Offices in China
国外总发行	中国国际图书贸易集团有限公司 (北京399信箱)	Foreign		China International Book Trading Corporation (Guoji Shudian), P. O. Box 399, Beijing 100044, China

中国标准连续出版物号: ISSN 0250-3301
CN 11-1895/X

国内邮发代号: 2-821

国外发行代号: M 205

国内定价: 160.00元

国内外公开发行人



中科期刊



中科期刊

ISSN 0250-3301



9 770250 330202

