

环境工程学报

HUANJING GONGCHENG XUEBAO

月刊 1980年创刊

2018年7月 第12卷 第7期

主管 中国科学院

主办 中国科学院生态环境研究中心

主编 刘俊新

编辑 《环境工程学报》编辑部

北京市海淀区双清路18号

邮政编码 100085

电话/传真 010-62941074

E-mail cjee@rcees.ac.cn

网址 www.cjee.ac.cn

出版 科学出版社

北京东黄城根北街16号

邮政编码 100717

印刷装订 北京科信印刷有限公司

国内发行

中国邮政集团公司北京市报刊发行局

广告发布登记

京海工商广登字20170090号

出版日期 每月5日

国际标准连续出版物号 ISSN 1673-9108

国内统一连续出版物号 CN 11-5591/X

国内外公开发行

全国各地邮局订购

国内邮发代号: 82-448

国内定价: 120.00元

Chinese Journal of Environmental Engineering

Monthly Started in 1980

Vol.12 No.7 July 2018

Supervised by Chinese Academy of Sciences

Sponsored by Research Center for
Eco-Environmental Sciences, Chinese
Academy of Sciences

Editor-in-Chief LIU Junxin

Edited by The Editorial Board of Chinese
Journal of Environmental Engineering

Published by Science Press

16 Donghuangchenggen North Street
Beijing 100717, China

Printed by Beijing Kexin Printing Co.,Ltd.

Foreign Distributed by China National
Publishing Industry Trading Corporation
(CNPITC)

P.O.Box 782, Beijing 100011, China

目次

专论与综述

- 1853 排水管道中硫酸盐还原菌与产甲烷菌的竞争与调控
王洪臣,汪俊妍,刘秀红,黄冬,徐相龙,张景炳

水污染防治

- 1865 Ti/Ru/SnO₂+Sb₂O₃电极的制备及其对垃圾渗滤液的电催化氧化
汪昕蕾,秦侠,袁少鹏,周梦楠,焦点
- 1872 印染污泥制备活性炭对亚甲基蓝的吸附
陈垂汉,孙建洋,李莹,赵旭,郭红娟
- 1879 高锰酸钾对藻细胞及胞外有机物的控制效果
李春梅,许仕荣,王长平,刘凯
- 1888 厌氧氨氧化耦合部分反硝化处理低浓度氨氮废水
陈国燕,彭党聪,李惠娟,姚倩,孙红方
- 1896 pH对中和沉淀法处理涂装废水效果影响及作用机理
付海娟,池勇志,赵建海,田秉晖,付翠莲,郑先强
- 1907 生物吸附-多级A/O-活性焦组合工艺对污水中氮磷及有机污染物的去除
王东,王小东,朱引,沈斐,李激,王硕
- 1917 不同粒径生物炭和泥鳅对人工湿地植物根系形态及基质硝化与反硝化能力的影响
徐德福,李振威,李映雪,潘潜澄,陈晓艺,王琪飞,李鑫,管益东
- 1926 藻菌共生生物接触转盘反应器的研制和运行
张剑桥,金文标,涂仁杰,郭艳梅,周旭
- 1934 流化床结晶软化高硬度地下水及其晶体生长动力学
孙闯,杨晓芳,何华,王东升
- 1942 双氧水协同生化法处理实际印染废水
唐嘉丽,岳秀,于广平,刘坚
- 1951 海绵城市下垫面基质优化及其对模拟雨水处理效果
王鑫,刘雅慧,宁梓洁,高殊净

大气污染防治

- 1959 煤基活性炭表面改性对稀土负载型CeO₂/AC低温脱硝性能的影响
陈薇,肖高,郭杰,刘明华,齐赛男,刘学虎,李军,华坚,王涛,李新
- 1968 快速SCR反应对商用V₂O₅-WO₃/TiO₂催化剂脱硝特性的影响
杨晓刚,马强,牛国平,徐晓涛
- 1977 介质阻挡放电等离子体降解高浓度甲苯
王保伟,姚淑美,彭叶平,押玉荣,王晓磊,安少锋
- 1986 制备工艺对V₂O₅/TiO₂ SCR催化剂脱硝性能的影响
李慧,陆强,韩健,杨江毅,李文艳,杨勇平

- 1996 无机、有机添加剂对磷矿浆脱硫强化的影响
李创,张冬冬,宁平,王思鼎,吴琼,李石雷,张慧芳,李鹏毅
- 2004 DOC系统催化性能的仿真和分析
谭理刚,郭雅各,杨树宝,冯鹏飞,李子文
- 2010 新型管状光催化反应器降解VOCs特性
刘鹏,郑洁,周亚亚,周雪梅
- 2018 湍流器对湿法脱硫塔内热态流场影响的数值模拟
戚美,陈朋,陈庆光,王立夫
- 2029 某1 000 MW机组电除尘器气固两相流数值模拟
刘含笑,刘猛,焦磊,赵琳,骆建友,许东旭,郭滢

土壤污染防治

- 2039 3种环保型淋洗剂对重金属污染土壤的淋洗效果
姚瑶,张世熔,王怡君,王贵胤,徐小逊,李婷
- 2047 6种低分子有机酸对针铁矿、蒙脱石和生物炭中结合态Cd
活化效果的对比
罗涛,李取生,陈惠君,方皓,魏佳
- 2056 地质聚合物固化稳定化重金属复合污染土壤
廖希雯,陈杰,范天凤,黎珊,陈玉萍,魏世强
- 2066 电化学联合H₂O₂氧化淋洗修复典型化工厂遗留地铬污染
土壤
刘亦博,成杰民
- 2075 Cd污染土壤的电动修复及其强化
万玉山,沈梦,陈艳秋,韩惠,温馨,王明新

固体废物处理与资源化

- 2084 9种抗生素对污泥高温厌氧消化的急性抑制
马清佳,田哲,员建,宋建阳,杨敏,张昱
- 2094 炭材料调理改善活性污泥脱水性能的影响机制
同帆,王瑞露,曹秉帝,张伟军,王东升
- 2106 农村不同类型有机固体废弃物混合堆肥配比优化
颜瑾,李燕,熊仁,马嘉伟,肖本益,刘俊新,郭雪松,刘越
- 2114 污泥水热联合热解处理对固相产物中重金属的影响
谢胜禹,余广炜,李杰,尤甫天,汪刚,汪印,马建立,商晓甫
- 2123 餐厨垃圾湿式厌氧消化最优有机负荷及失稳指标
曹秀芹,袁海光,丁浩,徐国庆

工程应用实例

- 2132 再生水补水河道水质的生态修复示范工程及效能分析
王骁,许素,陶文绮,郭敏

《环境工程学报》 第3届编辑委员会

指导委员会委员

郝吉明 曲久辉 张全兴
任南琪 侯立安 张远航

主 编 刘俊新

副主编 王晓昌 贺 泓 崔福义
李金惠 高宝玉 刘会娟
王爱杰

编 委 (以姓氏笔画为序)

马 军 王凯军 王洪臣 王跃思
仇荣亮 吕锡武 全 燮 刘双江
刘勇弟 刘维屏 孙德智 李大鹏
李玉友 李爱民 杨 敏 何 强
何品晶 余 刚 宋存义 张付申
张福锁 陈 卫 陈少华 陈光浩
陈嘉平 季 民 金 波 周 琪
单保庆 赵勇胜 郝晓地 俞汉青
党 志 徐向阳 黄 勇 曾光明
解跃峰

编辑部主任 张利田

责任编辑 郑晓梅 靳 炜
刘 颖 金曙光

封面设计 吴春旭

CONTENTS

- 1853 **Competition and regulation of sulfate-reducing bacteria and methanogenic archaea in sewers**
WANG Hongchen, WANG Junyan, LIU Xiuhong, HUANG Dong, XU Xianglong, ZHANG Jingbing
- 1865 **Preparation of Ti/Ru/SnO₂+Sb₂O₅ electrode and electrocatalytic oxidation of landfill leachate**
WANG Xinlei, QIN Xia, YUAN Shaopeng, ZHOU Mengnan, JIAO Dian
- 1872 **Adsorption of methylene blue on activated carbon prepared from printing sludge**
CHEN Chuihan, SUN Jianyang, LI Ying, ZHAO Xu, WU Hongjuan
- 1879 **Effect of potassium permanganate on algal cells and extracellular organics control**
LI Chunmei, XU Shirong, WANG Changping, LIU Kai
- 1888 **Treating low-nitrogenous wastewater by coupling anammox with partial denitrification**
CHEN Guoyan, PENG Dangcong, LI Huijuan, YAO Qian, SUN Hongfang
- 1896 **Mechanism and effect of pH on coating wastewater in neutralization and precipitation process**
FU Haijuan, CHI Yongzhi, ZHAO Jianhai, TIAN Binghui, FU Cuilian, ZHENG Xianqiang
- 1907 **Removal of organic contaminants, nitrogen, phosphorus by combined adsorption-multistage A/O-activated coke process**
WANG Dong, WANG Xiaodong, ZHU Yin, SHEN Fei, LI Ji, WANG Shuo
- 1917 **Effects of different sizes of biochar and loach on plant root morphology and nitrification and denitrification in constructed wetland**
XU Defu, LI Zhengwei, LI Yingxue, PAN Qiancheng, CHEN Xiaoyi, WANG Qifei, LI Xing, GUAN Yidong
- 1926 **Development and operation of algal-bacterial symbiotic biological contact turntable reactor**
ZHANG Jianqiao, JIN Wenbiao, TU Renjie, GUO Yanmei, ZHOU Xu
- 1934 **Softening of high hardness groundwater and crystal growth kinetics in a fluidized bed crystallization reactor**
SUN Chuang, YANG Xiaofang, HE Hua, WANG Dongsheng
- 1942 **Treatment of real printing and dyeing wastewater by a H₂O₂-assisted biochemical method**
TANG Jiali, YUE Xiu, YU Guangping, LIU Jian
- 1951 **Matrix optimization for underlying surface in a sponge city and its effect on artificial rainwater treatment**
WANG Xin, LIU Yahui, NING Zijie, GAO Shujing
- 1959 **Effect of surface modification of coal based activated carbon on low temperature denitration performance of rare-earth supported CeO₂/AC**
CHEN Wei, XIAO Gao, GUO Jie, LIU Minghua, QI Sainan, LIU Xuehu, LI Jun, HUA Jian, WANG Tao, LI Xin
- 1968 **Effect of fast SCR reaction on denitration characteristics of commercial V₂O₅-WO₃/TiO₂ catalysts**
YANG Xiaogang, MA Qiang, NIU Guoping, XU Xiaotao
- 1977 **Degradation of high concentration toluene with dielectric barrier discharge plasma**
WANG Baowei, YAO Shumei, PENG Yeping, YA Yurong, WANG Xiaolei, AN Shaofeng
- 1986 **Effect of preparation technology on De-NO_x performance of V₂O₅/TiO₂ SCR catalysts**
LI Hui, LU Qiang, HAN Jian, YANG Jiangyi, LI Wenyan, YANG Yongping
- 1996 **Effects of inorganic and organic additives on desulfurization of phosphate ore slurry**
LI Chuang, ZHANG Dongdong, NING Ping, WANG Siding, WU Qiong, LI Shilei, ZHANG Huifang, LI Pengyi
- 2004 **Numerical simulation and analysis of catalytic performance of DOC system**
TAN Ligang, GUO Yage, YANG Shubao, FENG Pengfei, LI Ziwen
- 2010 **Removal performance of VOCs with novel annular air purifier**
LIU Peng, ZHENG Jie, ZHOU Yaya, ZHOU Xuemei
- 2018 **Numerical simulation of effect of turbulator on thermal flow field in wet flue gas desulfurization tower**
QI Mei, CHEN Peng, CHEN Qingguang, WANG Lifu
- 2029 **Numerical simulation of gas-solid two-phase flow in electrostatic precipitator of 1 000 MW unit**
LIU Hanxiao, LIU Meng, JIAO Lei, ZHAO Lin, LUO Jianyou, XU Dongxu, GUO Yin
- 2039 **Effects of different environmentally friendly washing agents on removal of soil heavy metals**
YAO Yao, ZHANG Shirong, WANG Yijun, WANG Guiyin, XU Xiaoxun, LI Ting
- 2047 **Comparison of activation effects of six kinds of low molecular weight organic acids on Cd bound to goethite, montmorillonite and biochar**
LUO Tao, LI Qusheng, CHEN Huijun, FANG Hao, WEI Jia
- 2056 **Soil of heavy metal composite pollution by geological polymer stabilization**
LIAO Xiwen, CHEN Jie, FAN Tianfeng, LI Shan, CHEN Yuping, WEI Shiqiang
- 2066 **Electrochemical and H₂O₂ oxidation with leaching to remove chromium from contaminated soil in a typical chemical deserted plant**
LIU Yibo, CHENG Jiemin
- 2075 **Electrokinetic remediation of Cd contaminated soil and its reinforcement measures**
WAN Yushan, SHEN Meng, CHEN Yanqiu, HAN Hui, WEN Xin, WANG Mingxin
- 2084 **Acute inhibition of nine antibiotics on sludge thermophilic anaerobic digestion**
MA Qingjia, TIAN Zhe, YUAN Jian, SONG Jianyang, YANG Min, ZHANG Yu
- 2094 **Mechanism of carbon conditioning for improving dewatering performance of activated sludge**
TONG Zhi, WANG Ruilu, CAO Bingdi, ZHANG Weijun, WANG Dongshen
- 2106 **Mixture ratio optimization of different organic solid waste co-composting in rural areas**
YAN Jin, LI Yan, XIONG Ren, MA Jiawei, XIAO Benyi, LIU Junxin, GUO Xuesong, LIU Yue
- 2114 **Effects of hydrothermal treatment coupled pyrolysis on heavy metals in solid products from sewage sludge**
XIE Shengyu, YU Guangwei, LI Jie, YOU Futian, WANG Gang, WANG Yin, MA Jianli, SHANG Xiaofu
- 2123 **Exploration of optimal organic loading rates and instability indicators in wet anaerobic digestion of kitchen waste**
CAO Xiuqin, YUAN Haiguang, DING Hao, XU Guoqing
- 2132 **Ecological restoration project of water quality in urban river supplied with reclaimed water and its efficiency analysis**
WANG Xiao, XU Su, TAO Wenqi, GUO Min