

ISSN 1001 - 9677

CN44 - 1228/TQ



扫码关注

# 广州化工

GUANGZHOU CHEMICAL INDUSTRY

- 《中国学术期刊综合评价数据库》统计源刊
- 《中国期刊全文数据库》全文收录期刊
- 《中国核心期刊（遴选）数据库》全文收录期刊

第 22 期  
2020年11月  
(下半月)  
第 48 卷

化工易  
HG1.COM.CN

多彩化工 · 专业视角



主办：  
广州化工研究设计院  
广州市化工行业协会



找化工原料  
就上化工易

# 广州化工

GUANGZHOU HUAGONG

《中国学术期刊综合评价数据库》统计源刊  
《中国核心期刊(遴选)数据库》全文收录期刊

《中国期刊全文数据库》全文收录期刊

高、中级化工职称资格评审认定期刊

广东省特色科技期刊

全国石油和化工期刊百强榜学术期刊 50 强

1973 年创刊(半月刊)

第 48 卷第 22 期

2020 年 11 月(下半月)

主 管:广州化工集团有限公司  
主 办:广州化工研究设计院  
广州市化工行业协会  
协 办:广州市化学化工学会

编辑出版:《广州化工》编辑部  
主 编:吴文莉  
副 主 编:林珺颖  
编 辑:刘倩婷、何启宏  
广 告:茅仁旭  
地 址:广州市白云区鹤联街 229 号万力创新园  
D 座  
邮 码:510425  
电 话:(020)36372165  
邮 箱:gzhgbjb@vip.126.com  
印 刷:南方医科大学广州广卫印刷厂  
发行范围:国内外公开发行  
国外发行:中国出版对外贸易总公司  
(北京 782 信箱)

国际标准刊号:ISSN1001-9677

国内统一刊号:CN44-1228/TQ

广告经营许可证:穗工商广字 4401004002668 号

出版物经营许可证:新出发粤刊总批字第 226 号

国内定价:28.00 元/期 全年 672.00 元(共 24 期)

## 第九届编委会成员名单(按姓氏笔画排序)

马小明 方岩雄 尹国强 卢 江 叶代勇  
叶家灿 吕满庚 刘自力 闫 利 麦堪成  
麦裕良 李伟华 李攻科 李雪辉 杨丽庭  
杨育农 吴文莉 余 林 陈旭东 周添国  
郑 成 赵建红 赵建青 徐志达 章明秋  
彭 峰 童叶翔 曾松峰 楼宏铭 蔡卫权  
廖 兵 谭志良

# 目 次

## 专论与综述

- 生物质制备糠醛及其研究进展 ..... 赵芷言, 丁佳晶, 夏斐斐, 杨凤丽(1)  
负载方式和负载体对  $TiO_2$  性能影响的研究进展 ..... 孙嘉敏, 张彧涵, 陈学濡, 贺彬烜, 蒋恩臣, 简秀梅(4)  
稀土元素掺杂  $TiO_2$  光催化性能研究进展 ..... 谭 敏, 王 栋(10)  
硫化矿微生物浸矿机理及动力学模型研究进展 ..... 曹 猛, 李 侠(13)  
浅谈基于冠醚及葫芦脲超分子轮烷的构筑 ..... 周维磊(17)  
碳钢盐酸酸洗缓蚀剂的研究进展 ..... 罗大钊, 刘晓平, 王梦蝶, 张昕怡(20)  
氟硅协同改性丙烯酸基抗腐蚀树脂研究进展 ..... 郭玉娣, 王晓萍, 周金磊, 尚豪身, 华梦瑶, 赵二庆(22)  
空气中甲醛净化处理的研究进展 ..... 张永航(24)  
壳聚糖应用于水泥基材料研究进展 ..... 王 岩(28)

## 科学实验

- 吡咯烷-2,4-二酮类化合物的合成 ..... 聂 磊, 闫 琳, 韩 超(31)  
Co-N-C 催化 Heck 反应性能研究 ..... 黄 穗, 田 蓉, 杨江红(33)  
石墨烯/ $Gd_2O_3$ : $Eu^{3+}$ 复合材料的制备 ..... 宋 浩, 庞明俊, 乔 俊, 陈志文, 杜雅琴, 邢宝岩, 赵建国(36)  
4-环丙基氨基甲酰-苯硼酸合成工艺优化 ..... 韦启迪, 杨东红, 罗 鸣, 宋朱渝, 孔德章, 吴明开(39)  
N-烷基羟胺与苯丙炔酸酯的加成反应合成  $\beta$ -氨基酸衍生物硝酮 ..... 张 豪, 张志豪, 李宁杰, 孙 禹, 曾宇航, 刘益林(41)  
离子液体在水和碳烃溶液中分解特性研究 ..... 朱 畔, 曹 燕, 郭义仓, 李佳书, 李进龙(44)  
高镍  $LiNi_{0.9}Co_{0.05}Mn_{0.05}O_2$  正极材料的形貌调控及电化学性能研究 ..... 李作伟, 赖 晶, 向 伟, 吴振国, 郭孝东, 钟本和(46)  
改性纳米零价铁降解水中三氯乙烯 ..... 詹 聪(51)  
一种新型非离子型水性环氧树脂固化剂的合成 ..... 陶 果, 蒲礼佳, 杨 帆, 常 波, 张 琦, 任 南, 陈自然, 徐友辉(54)  
 $TiO_2/Ag_3PO_4$  复合催化剂的制备及光催化性能测试 ..... 屠东花, 袁守军(58)  
铁镍合金粉体尺寸和粒度分布对于其微波吸收性能的影响 ..... 刘 博, 许 成, 张莹莹, 周 岩, 时 卓(62)

硅溶胶对水性环氧树脂分散体性能的影响	官 慧,刘文杰,陈 森(66)
钢结构用水性丙烯酸底漆的制备与性能研究	朱斌勇,张博晓,裴 勇,张 培(69)
高层建筑用 Q460GJC-Z35 钢板的研究	李治阳(72)
高性能污泥水煤浆分散剂的制备与成浆性研究	马少莲,岳丽娜(74)
磷石膏替代天然二水石膏在水泥生产中的应用研究	夏晓松,黄军福(77)
无碱液体速凝剂的反应机理与水泥适应性研究	聂章运,欧阳会幼,任俊鹏,王 舜,韩汝森(80)
四川马边-金阳地区磷精矿硫酸分解实验研究	李 超,刘述平,徐凌飞,邓 杰,唐湘平,钟庆文(83)
油水环状流在突变管道内的数值模拟研究	姚建军,吴君强,郭春雷(86)
莪术油超声提取工艺优化及生物活性研究	赵海燕,许 钰,班颖芳,张义浩,蔡吉祥(90)
响应面优化匀毛尖茶多酚的提取工艺	喻 俊,李亚波(94)
枇杷叶总黄酮的减压内部沸腾提取工艺研究	翁艳英,张贞发(97)
烟草废弃物中茄尼醇汽爆提取及过程条件优化	
	刘明宏,刘 京,韩小斌,李 波,赵国杰,何文清,刘家磊(100)
含山银花-野菊花提取物防晒霜的初步研制	
	高 端,叶 萍,王 艳,廖东娜,邓建斌,陈 蓉,齐 娜(104)
碳量子点的合成及其在 SDBS 检测中的应用	
	孙 娜,黄毅峰,张永鸿,徐京娜,潘 登,杨金花,李 萍(108)

## 分析测试

基于液液萃取法提取土壤中 PAEs 污染物的萃取剂筛选	熊丽媛,王 壤,刘 悅,王 振,王 萍(111)
ICP-MS 法同时测定铁树叶中 5 种重金属元素含量	陈广云,金 鹏,陈小红,李 佳,金 华(114)
HPLC 法定量测定青橄榄中没食子酸含量	冯 娟,李秋平,黄思睿,张清杰,覃 亮(117)
头孢类药物生理盐水溶液的电导率测定	
	孟薇薇,陈建平,刘悦宇,成日青,马 岚,王来兵,齐和日玛,塔 娜,郭慧卿(120)
沉香叶的薄层色谱鉴别及 HPLC 含量测定	李锦云,柯泽涛,谢晨星,廖锦红,李永辉(124)
亲水相互作用色谱-串联质谱法测定饮用水中的 4 种甜味剂	刘向凌,刘洪忠,王鹏坤,马 斐(127)
ICP-AES 法测定高纯磷酸铜中五种着色杂质元素	刘 艳,王琳琨,唐继鲜,杨 峰,郑 悅(130)
火焰原子吸收光谱法定肉苁蓉中钙、镁、锌的含量	裴 秀(132)
氢化物发生-原子荧光光谱法测定土壤中硒含量	王 涛,纪 鑫,程佳欣,朱同贵,晏 娟(135)
骨疏宁口服液的薄层鉴别和含量测定方法研究	吴勇梅,何 科,徐 锦,韦玉燕(138)
拐枣与拐枣养生酒总黄酮的含量分析比较研究	
	杨 玥,杨再波,贺银菊,苏 军,刘娇娇,邓 焦,郭银粉,梁馨元(143)
育发类化妆品中甾体激素含量的不确定度评价	付金凤,朱晓雯(146)

## 环境保护

汕头市澄海区春季大气细颗粒物来源解析及特征分析	
	李 娟,肖亮洪,郭 岩,黄宜耀,张宇烽,陈舒迟(149)
城市生活垃圾焚烧飞灰的处理与处置方法	庞瑞华,查甫更,金 苏,汪 飞(153)
论环境空气自动监测发展前景及存在问题	张 媛,马志刚,刘清伟,谢振升,鲁银明,冯海霞(155)
污泥活性炭协调处理生活垃圾焚烧飞灰的可行性分析	金 苏,胡友彪(157)

# 化工机械

超临界运行机组热力系统分段化学清洗 ..... 史 妮, 梅其政, 曾小义, 王 钢(160)

## 教学园地

- 将应用实例引入无机材料分析方法课程教学实践研究 ..... 李 妍, 葛 强(165)  
有机化学教学中适当增加不对称催化内容的探讨 ..... 唐生表(168)  
双维双层《结构化学》混合式线上教学初探 ..... 赵燕云, 程学礼(170)  
氧化还原认知模型在氯及其化合物复习课中的应用 ..... 刘 雯(173)  
生物制药专业药物化学实验设计性综合性实验创新教学 ..... 付迎波(175)  
省属高校材料专业学生工程实践能力现状与对策 ..... 汪存龙, 陈 刚(178)  
炼焦虚拟仿真工厂建设与教学模式探索 ..... 孙 章, 谢全安, 孙晓然(181)  
基于超星+QQ 课堂的有机化学教学探索与实践 .....  
..... 陈修栋, 占昌朝, 严 平, 王春风, 刘金杭, 汪亚威, 曹小华(183)  
“科研育人”背景下药学生创新创业能力的培养 ..... 胡娅琪, 秦 蕙, 张 博(186)  
《药物分析》MOOC+SPOC 教学模式探索 ..... 黄 琦, 刘宣淦, 叶春林(189)  
《有机光电材料和器件》课程建设探索 ..... 刘俊霞, 张文凯, 房晓敏(192)  
新工科背景下地方院校《材料科学基础》教学改革 ..... 孙琳琳, 黄 玲, 焦更生, 郑 博(194)  
基于新工科理念的多层次互助型教学模式探索 ..... 房海秋, 赵锦程, 王 凯(196)  
从化学类硕士生科研水平反思本科实验教学 ..... 何 倩(199)  
《化工文献检索》与毕业论文融合的教改研究 ..... 侯慧玉(201)  
利用创新创业计划项目培养化学专业本科生的科研能力 ..... 张建安(203)  
关于矿物加工工程专业中物理化学教学的几点思考 ..... 聂文林, 阳小勇(205)  
新疆能源化学工程专业职业教育本科建设可行性研究 .....  
..... 李进良, 张国伟, 吴 桐, 喻朝善, 刘 芳, 李长海, 赵 贺(207)  
依托科研成果转化案例强化创新创业能力培养 .....  
..... 张 鸿, 王远贞, 王华旗, 郭 静, 夏 英, 宫玉梅, 于 跃, 赵 秒, 王 艳, 施晓航, 张 森, 刘元法(211)  
基于安全意识培养的化工原理实验教学研究与探索 ..... 张正红, 林 峰(213)  
基于雨课堂的混合教学模式在《药物化学》中的应用 ..... 朱丽飞, 赵玉丛, 王笃学(215)  
“卓越”与“认证”相结合提高工程教育质量 ..... 郑仁林, 黄 毅, 李良春, 陈红英, 袁小红(218)  
仪器分析在线教学实践与思考 ..... 刘 阳, 刘运美, 曾要富, 彭俊梅, 郭 玉(220)  
技能培养背景下《工业分析》课程改革与实践 ..... 刘君红, 邱 岳, 周 丽, 胡红玲(222)  
工科化学实践性教学改革的思考与探索 ..... 罗序燕, 熊道陵, 张彩霞, 刘典梅, 欧阳少波(225)  
疫情背景下制剂设备课程的改革与实践 ..... 马 丽, 朱金燕, 刘慧娟, 孙加燕, 查 元(227)  
分析化学课程思政教育教学探索与实践 ..... 可 迪, 陈明丽, 杨 婷, 于永丽, 赵 爽(229)  
基础化学实验课程中融入思政教育的探索与实践 .....  
..... 冒爱荣, 姚 瑶, 孙明珠, 杨春红, 王玉琴, 曹淑红, 邵 荣(232)  
化工类高职学生成才教育课程建设与实践研究 ..... 李恺翔(235)  
新工科背景下《材料科学前沿》课程创新人才培养教学实践 .....  
..... 严 岩, 李 权, 于 坤, 刘晓魁, 宋春林, 刘 岗(237)

## 安全与管理

注减氧空气驱油注气系统空压机爆炸风险分析 ..... 王 典, 史宝成, 应若蒙, 潘建澎, 张兴凯, 张引弟(240)

# CONTENTS

Preparation of Furfural from Biomass and Its Research Progress .....	ZHAO Zhi-yan, DING Jia-jing, XIA Fei-fei, YANG Feng-li(1)
Effect of Different Loading Methods and Carriers on Performance of Photocatalyst .....	SUN Jia-min, ZHANG Yu-han, CHEN Xue-ru, HE Bin-xuan, JIANG En-chen, JIAN Xiu-mei(4)
Research Progress on Photocatalytic Properties of Rare Earth Doped Titanium Dioxide .....	TAN Min, WANG Dong(10)
Research Progress on Mechanism and Kinetic Model of Bioleaching of Sulfide Ores .....	CAO Meng, LI Xia(13)
A Brief Discussion on Construction of Supramolecular Rotaxane Based on Crown Ether and Cucurbituril .....	ZHOU Wei-lei(17)
Research Progress on Corrosion Inhibitor for Hydrochloric Acid Pickling of Carbon Steel .....	LUO Da-zhao, LIU Xiao-ping, WANG Meng-die, ZHANG Xin-yi(20)
Research Progress on Fluorine-silicone Modified Acrylic Based Anti-corrosive Resin .....	GUO Yu-di, WANG Xiao-ping, ZHOU Jin-lei, SHANG Hao-shen, HUA Meng-yao, ZHAO Er-qing(22)
Research Progress on Formaldehyde Purification in Air .....	ZHANG Yong-hang(24)
Research Progress on Chitosan Used in Cement-based Materials .....	WANG Yan(28)
Synthesis of 2,4-pyrrolidinedione Compounds .....	NIE Lei, YAN Lin, HAN Chao(31)
Study on Catalytic Performance of Co-N-C for Heck Reaction .....	HUANG Sui, TIAN Rong, YANG Jiang-hong(33)
Preparation of Graphene/Gd <sub>2</sub> O <sub>3</sub> .Eu <sup>3+</sup> Composites .....	SONG Jie, PANG Ming-jun, QIAO Jun, CHEN Zhi-wen, DU Ya-qin, XING Bao-yan, ZHAO Jian-guo(36)
Optimization of Synthesis Process of 4-cyclopropyl Carbamyl-benzoboronic Acid .....	WEI Qi-di, YANG Dong-hong, LUO Ming, SONG Zhu-yu, KONG De-zhang, WU Ming-kai(39)
Synthesis of $\beta$ -amino Acid Derived Nitrones via Addition of N-Alkylhydroxylamines to Phenylpropargyl Ester .....	ZHANG Hao, ZHANG Zhi-hao, LI Ning-jie, SUN Yu, ZENG Yu-hang, LIU Yi-lin(41)
Study on Decomposition Characteristics of Ionic Liquid in Aqueous and Hydrocarbon Solutions .....	ZHU Ye, CAO Yan, GUO Yi-cang, LI Jia-shu, LI Jin-long(44)
Study on Morphology Regulation and Electrochemical Performance of High-nickel LiNi <sub>0.9</sub> Co <sub>0.05</sub> Mn <sub>0.05</sub> O <sub>2</sub> Cathode Material .....	LI Zuo-wei, LAI Jing, XIANG Wei, WU Zhen-guo, GUO Xiao-dong, ZHONG Ben-he(46)
Degradation of Trichloroethylene from Water by Modified Nano-zero-valent Iron .....	ZHAN Cong(51)
Synthesis of A Novel Nonionic Waterborne Epoxy Resin Curing Agent .....	TAO Guo, PU Li-jia, YANG Fan, CHANG Bo, ZHANG Qi, REN Nan, CHEN Zi-ran, XU You-hui(54)
Preparation and Photocatalytic Performance Test of TiO <sub>2</sub> /Ag <sub>3</sub> PO <sub>4</sub> Composite Catalyst .....	TU Dong-hua, YUAN Shou-jun(58)
Influence of Size and Particle Size Distribution of Ferronickel Alloy Powder on Its Microwave Absorption Properties .....	LIU Bo, XU Cheng, ZHANG Ying-ying, ZHOU Yan, SHI Zhuo(62)
Effect of Silica Sol on Properties of Waterborne Epoxy Resin Dispersion .....	GUAN Hui, LIU Wen-jie, CHEN Miao(66)
Preparation and Properties of Waterborne Acrylic Primer for Steel Structure .....	ZHU Bin-yong, ZHANG Bo-xiao, PEI Yong, ZHANG Pei(69)
Study on Q460GJC-Z35 Plate for High-rises .....	LI Zhi-yang(72)
Preparation of High-performance Dispersant of Coal Sludge Slurry and Slurryability Research .....	MA Shao-lian, YUE Li-na(74)
Study on Application of Phosphogypsum instead of Natural Dihydrate Gypsum in Cement Production .....	XIA Xiao-song, HUANG Jun-fu(77)
Study on Reaction Mechanism and Cement Adaptability of Alkali-free Liquid Accelerator .....	NIE Zhang-yun, OUYANG Hui-you, REN Jun-peng, WANG Yu, HAN Ru-sen(80)
Experimental Study on Decomposition of Phosphate Concentrate by Sulfuric Acid in Mabian-Jinyang Area, Sichuan .....	LI Chao, LIU Shu-ping, XU Ling-fei, DENG Jie, TANG Xiang-ping, ZHONG Qing-wen(83)
Numerical Simulation of Oil-water Annular Flow in An Abrupt Pipe .....	YAO Jian-jun, WU Jun-qiang, GUO Chun-lei(86)
Study on Optimization of Ultrasound Extraction Technology and Biological Activity of Volatile Oil from Curcuma Kwangsiensis .....	ZHAO Hai-yan, XU Yu, BAN Ying-fang, ZHANG Yi-hao, CAI Ji-xiang(90)
Response Surface Methodology for Optimization Extraction of Tea Polyphenols from Duyun Maojian .....	YU Jun, LI Ya-bo(94)
Study on Decompressing Inner Ebullition Extraction Process of Total Flavonoids from Loquat Leaves .....	WENG Yan-ying, ZHANG Zhen-fa(97)
Extraction of Solanesol from Tobacco Waste by Steam Explosion and Optimization of Its Process Conditions .....	LIU Ming-hong, LIU Jing, HAN Xiao-bin, LI Bo, ZHAO Guo-jie, HE Wen-qing, LIU Jia-lei(100)

Preliminary Development of Sunscreen Containing Mountain Honeysuckle and Wild Chrysanthemum Flower .....	GAO Duan, YE Ping, WANG Yan, LIAO Dong-na, DENG Jian-bin, CHEN Rong, QI Na(104)
Synthesis of Carbon Quantum Dots and Its Application in Detection of SDBS .....	SUN Na, HUANG Yi-feng, ZHANG Yong-hong, XU Jing-na, PAN Deng, YANG Jin-hua, LI Ping(108)
Screening of Extractants for Extracting PAEs from Soil by Liquid-liquid Extraction .....	XIONG Li-yuan, WANG Yao, LIU Yue, WANG Zhen, WANG Ping(111)
Simultaneous Determination of Five Heavy Metal Elements in <i>Cycatia Folium</i> by ICP-MS .....	CHEN Guang-yun, JIN Peng, CHEN Xiao-hong, LI Jia, JIN Hua(114)
Quantitative Determination of Gallic Acid in Green Olives by HPLC .....	FENG Juan, LI Qiu-ping, HUANG Si-rui, ZHANG Qing-jie, QIN Liang(117)
Measurement of Conductivity of Cephalosporins in Normal Saline Solution .....	MENG Wei-wei, CHEN Jian-ping, LIU Yue-yu, CHENG Ri-qing, MA Lan, WANG Lai-bing, Qiherima, Tana, GUO Hui-qing(120)
Study on TLC Identification and HPLC Determination for <i>Aquilaria Sinensis</i> Leaves .....	LI Jin-yun, KE Ze-tao, XIE Chen-xing, LIAO Jin-hong, LI Yong-hui(124)
Determination of Four Kinds of Artificial Sweeteners in Drinking Water by Hydrophilic Interaction Liquid Chromatography-tandem Mass Spectrometry .....	LIU Xiang-ling, LIU Hong-zhong, WANG Peng-kun, MA Fei(127)
Determination of Coloring Impurities in High Purity Copper Phosphate by ICP-AES .....	LIU Yan, WANG Lin-kun, TANG Ji-xian, YANG Feng, ZHENG Yue(130)
Determination of Contents for Mg, Ca, Zn in Cistanche by Flame Atomic Absorption Spectrometry .....	PEI Xiu(132)
Derermination of Selenium in Soil by Atomic Fluorescence Spectroscopy .....	WANG Tao, JI Xin, CHENG Jia-xin, ZHU Tong-gui, YAN Juan(135)
Study on TLC Identification and Content Determination of Gushuning Oral Liquid .....	WU Yong-mei, HE Ke, XU Jin, WEI Yu-yan(138)
Analysis and Comparison of Content of Total Flavonoids in Hovenia Acerba Lindl and Hovenia Acerba Lindl Health Wine .....	YANG Yue, YANG Zai-bo, HE Yin-ju, SU Jun, LIU Jiao-jiao, DENG Jiao, GUO Yin-fen, LIANG Xin-qi(143)
Evaluation of Uncertainty in Determination of Steroid Hormones in Hair-raising Cosmetics .....	FU Jin-feng, ZHU Xiao-wen(146)
Source Analysis and Characteristic Analysis of Atmospheric Fine Particulate Matter in Chenghai District of Shantou in Spring .....	LI Juan, XIAO Liang-hong, GUO Yan, HUANG Yi-yao, ZHANG Yu-feng, CHEN Shu-chi(149)
Review on Treatment and Disposal of Municipal Solid Waste Incineration Fly Ash .....	PANG Rui-hua, ZHA Fu-geng, JIN Su, WANG Fei(153)
Discussion on Development Prospect and Existing Problems of Ambient Air Automatic Monitoring .....	ZHANG Yuan, MA Zhi-gang, LIU Qing-wei, XIE Zhen-sheng, LU Kun-ming, FENG Hai-xia(155)
Feasibility Analysis of Activated Sludge Adsorption of Heavy Metals in Fly Ash from Domestic Waste Incineration .....	JIN Su, HU You-biao(157)
Staged Chemical Cleaning of Thermal System for Supercritical Operating Thermal Power Unit .....	SHI Ni, MEI Qi-zheng, ZENG Xiao-yi, WANG Gang(160)
Introducing Application Examples into Inorganic Materials Analysis Method Course .....	LI Yan, GE Qiang(165)
Discussion on Adding Asymmetric Catalysis Content in Organic Chemistry Teaching .....	TANG Sheng-biao(168)
Exploration on Two-dimensional and Double-leveled Blending Online Teaching and Learning of Structural Chemistry .....	ZHAO Yan-yun, CHENG Xue-li (170)
Application of Redox Cognitive Model in Review Lesson of Chlorine and Its Compounds .....	LIU Wen(173)
Comprehensive Innovative Experiment Teaching of Pharmaceutical Chemistry Experiment in Biopharmaceutical Specialty .....	FU Ying-bo(175)
Status and Improving Strategies of Engineering Practice Abilities for Material Related Majors' Undergraduate Students in Provincial Universities .....	WANG Cun-long, CHEN Gang(178)
Construction of Virtual Simulation Coking Plant and Exploration on Teaching Mode .....	SUN Zhang, XIE Quan-an, SUN Xiao-ran(181)
Exploration and Practice of Organic Chemistry Teaching Based on Chaoxing+ QQ Classroom .....	CHEN Xiu-dong, ZHAN Chang-chao, YAN Ping, WANG Chun-feng, LIU Jin-hang, WANG Ya-wei, CAO Xiao-hua(183)
Training of Innovative and Entrepreneurial Ability of Students Majoring in Pharmacy under the Background of Scientific Research and Education .....	HU Ya-qi, QIN Bei, ZHANG Bo(186)
Exploration of MOOC + SPOC Teaching Mode of Pharmaceutical Analysis .....	HUANG Qi, LIU Xuan-gan, YE Chun-lin(189)
Exploration of Curriculum Construction of Organic Optical-electronic Materials and Devices .....	LIU Jun-xia, ZHANG Wen-kai, FANG Xiao-min(192)
Exploration on Curriculum Reform of Fundamentals of Materials Science in Local Universities under the New Engineering Background .....	SUN Lin-lin, HUANG Ling, JIAO Geng-sheng, ZHENG Bo(194)

- Exploration of Multi-level and Mutual Aid Teaching Mode Based on New Engineering Concept .....  
 ..... *FANG Hai-qiu, ZHAO Jin-cheng, WANG Kai*(196)
- Reflection on Experiment Teaching for Undergraduates from Research Level of Master Candidates in Chemistry .....  
 ..... *HE Qian*(199)
- Research on Teaching Reform of Integration of Chemical Engineering Document Retrieval and Graduation Thesis ... *HOU Hui-yu*(201)
- Cultivating Undergraduate's Scientific Research Ability by Innovation and Entrepreneurship Program .....  
 ..... *ZHANG Jian-an*(203)
- Several Ideas on Physical Chemistry Teaching of Mineral Processing Engineering Major ..... *NIE Wen-lin, YANG Xiao-yong*(205)
- Feasibility Study on Undergraduate Construction of Vocational Education of Energy Chemical Engineering in Xinjiang .....  
 ..... *LI Jin-liang, ZHANG Guo-wei, WU Tong, YU Chao-shan, LIU Fang, LI Chang-hai, ZHAO He*(207)
- Facilitating Cultivation of Innovation and Entrepreneurship Abilities of Engineering Talents Based on A Platform to Transform Scientific Achievements into Educational Cases .....  
 ..... *ZHANG Hong, WANG Yuan-zhen, WANG Hua-qi, GUO Jing, XIA Ying, GONG Yu-mei, YU Yue, ZHAO Miao, WANG Yan, TUO Xiao-hang, ZHANG Sen, LIU Yuan-fa*(211)
- Exploration and Practice on Security Awareness Training in Chemical Engineering Principles Experiment .....  
 ..... *ZHANG Zheng-hong, LIN Feng*(213)
- Application of Hybrid Learning Mode Based on "Rain Classroom" in Medicinal Chemistry .....  
 ..... *ZHU Li-fei, ZHAO Yu-cong, WANG Du-xue*(215)
- Improvement on Quality of Engineering Education by PETOE Combined with EED ..... *ZHENG Ren-lin, HUANG Yi, LI Liang-chun, CHEN Hong-ying, YUAN Xiao-hong*(218)
- Online Teaching Practice and Thinking of Instrument Analysis Course .....  
 ..... *LIU Yang, LIU Yun-mei, ZENG Yao-fu, PENG Jun-me, GUO Yu*(220)
- Reform and Practice on Industrial Analysis Curriculum under the Skill Training Background .....  
 ..... *LIU Jun-hong, QIU Yue, ZHOU Li, HU Hong-ling*(222)
- Thinking and Exploration on Practical Teaching Reform of Engineering Chemistry ..... *LUO Xu-yan, XIONG Dao-ling, ZHANG Cai-xia, LIU Dian-mei, OUYANG Shao-bo*(225)
- Reform and Practice on Pharmaceutical Equipment Under the Background of Epidemic .....  
 ..... *MA Li, ZHU Jin-yan, LIU Hui-juan, SUN Jia-yan, ZHA Yuan*(227)
- Exploration and Practice of Course Ideology and Politics in Analytical Chemistry Teaching ..... *KE Di, CHEN Ming-li, YANG Ting, YU Yong-li, ZHAO Shuang*(229)
- Exploration and Practice on Ideological and Political Education Integrated into Basic Chemistry Experiment Course .....  
 ..... *MAO Ai-rong, YAO Yao, SUN Ming-zhu, YANG Chun-hong, WANG Yu-qin, CAO Shu-hong, SHAO Rong*(232)
- Construction and Practice of Quality Education Course for Higher Vocational Students in Chemical Industry ... *LI Kai-xiang*(235)
- Exploration on Talents Training Reform of Frontiers of Materials Science under the Background of New Engineering Education ...  
 ..... *YAN Yan, LI Quan, YU Kun, LIU Xiao-kui, SONG Chun-lin, LIU Gang*(237)
- Analysis of Explosion Risk of Air Compressor in Oil Flooding System with Oxygen Reducing Air Injection ... *WANG Dian, SHI Bao-cheng, YING Ruo-meng, PAN Jian-peng, ZHANG Xing-kai, ZHANG Yin-di*(240)

**GUANGZHOU CHEMICAL INDUSTRY**

**Open Publishing**

**Established in 1973 (Semimonthly)**

**Vol. 48 No. 22**

**Nov. 2020**

**Managed by:**

Guangzhou Chemical Industrial Group Co., Ltd.

**Sponsored by:**

Guangzhou Research & Design Institute of Chemical Industry

Guangzhou Society of Chemistry and Chemical Engineering

**Assisted by:**

Guangzhou Chemical Industry Association

**Edited by:**

Editorial Office of "GUANGZHOU CHEMICAL INDUSTRY"

**Chief Editor:** WU Wen-li

**Vice Chief Editor:** LIN Jun-ying

**Editor:** LIU Qian-ting, HE Qi-hong

**Advertisement Department:** MAO Ren-xu

**Address:** Building D, Vanlead Innovation Park, No. 229

Helian Street, Baiyun District, Guangzhou,

P. R. China

**Postcode:** 510425

**Tel:** (020) 36372165

**E-mail:** gzhgbjb@vip.126.com

**Printed by:**

Guangzhou Guangwei Printing Plant of Southern Medical University

**Overseas Distributed by:**

China National Publishing Industry Trading Corporation

**Journal Code:** ISSN 1001-9677  
 CN 44-1228/TQ

**Advertising Business License No. :** 4401004002668