

中文核心期刊 中国科技核心期刊 RCCSE 中国核心学术期刊

ISSN 1003-496X



# 煤矿安全<sup>®</sup>

## SAFETY IN COAL MINES



# 9

## 2020

第51卷 第9期  
2020年9月出版

ISSN 1003-496X



煤科集团沈阳研究院有限公司 主管 煤科集团沈阳研究院有限公司 主办

万方数据

# 目次

## 试验·研究

- 气煤的孔隙分形特征对瓦斯吸附的影响 刘纪坤,李成柱,王翠霞(1)
- 高瓦斯近距离煤层采空区卸压瓦斯大直径钻孔抽采试验研究 邵国安,邹永滔(6)
- 电位梯度对电化学改变贫煤瓦斯吸附解吸特性的影响实验研究 张晓雨,康天合,张润旭,张彬,康官先,张连昆(11)
- 非等压偏应力下多因素对煤体渗透率影响的敏感性分析 张亚琦,彭文庆(16)
- 阳泉矿区差异地质构造对煤体突出物性参数的影响 令狐建设,闫志铭,徐超(20)
- 水化煤风干热与自然发火特性实验研究 董子文,皮子坤,罗陈,彭斌,孟丽萍,魏世龙(24)
- 交联网状结构新型煤尘抑制剂的制备及性能研究 黄学满,丁光辉,张茜,陆伟(30)
- 不同解吸公式对混合粒度颗粒煤瓦斯解吸的适用性研究 李修磊(35)
- 煤气化渣高水充填材料的制备及其性能研究 徐阳,徐再刚,谢红飞,李翠芹,曹阳,陈前林(41)
- 长期气体作用下焦煤微观孔隙特性研究 牛文星,冯子军,杨一凡,万志军(47)
- 基于高精度微震监测的承压水上底抽巷合理位置研究 于春生,翟常治(52)
- 厚松散层薄基岩开采覆岩离层裂隙演变与下沉分形特征研究 郭龙辉,程桦,彭世龙,付宝杰(59)
- 基于重复正交试验的风积砂膏体充填材料配比 曹晓凡,唐亦川,邓念东,尚慧,王毅(65)

## 技术·创新

- 井下定向钻孔与地面“U”型井组直井对接技术 杨俊哲,金鑫,耿增洋(71)
- 高抽巷影响下的采空区煤自燃协同防控技术 邢立杰,刘芬,金彦,宋玉姗,郭军(75)
- 联络巷注氮微正压密闭漏风控制技术 刘忠全,王伟(81)
- 复杂环境条件下煤自燃火灾治理技术 曹凯(85)
- 邻空侧不规则遗留煤柱区巷道掘进冲击地压防治技术 董敬源,薛成春,曹安业,白贤栖,谷雨,周长峰(89)
- 浅埋煤层过沟掘进巷道顶板淋水治理技术 高彬,姬中奎,杨帆,张池,任智智,罗安昆,薛小渊(94)

## 设计·开发

- 煤矿瓦斯抽采钻孔直向钻进装置 段志国(98)
- 一种煤矿主要通风机风门状态传感器 程玉龙,王祖迅(101)
- 唐山矿卷帘风窗自动控制调风系统 苏需洋,朱令起,张嘉勇,周艺婷(104)
- 近水平孔PDC反循环取心钻头孔底岩心卡堵机理研究 唐胜利,方金,李泉新,刘建林,赵江鹏(108)
- 基于网络远程控制的矿用气相色谱仪 张军杰(114)
- 煤矿井下远距离本安供电技术 刘亚辉(118)
- 不提钻下筛管用大通径快插式螺旋钻杆 杨虎伟(122)
- ZDY2-300LM型双工作臂全液压坑道钻机 邵俊杰,张宁(126)

- 新型锚索让压器让压性能研究 吴玉意(130)
- 煤矿井下避难硐室安全要求 史志远,平立华,袁晓明(134)
- 中厚煤层顺层钻进轨迹控制工艺 董海潮,赵永哲(137)
- 煤矿井下新型防跑车挡车栏的设计 孙德标,郑毅,杨爱兰,仇德义,陈勇(140)

## 应用·实践

- KJ768 微震监测系统在高瓦斯矿井强矿压灾害预警中的应用 张广辉,邓志刚,蒋军军,安雨佳(144)
- 新型深孔爆破快速封孔材料及封孔新工艺 路晓荣,李西凡,熊祖强,胡亚超,王 隼(148)
- 聚氨酯加固材料的增强增韧及工程应用 潘树启,刘鲤棕,郭建伟,王玉超,于潇洋,柏广峰,于 光,孙 刚(153)
- 厚煤层大断面巷道超前支护技术 郭文彬,马传斌,宋文杰(157)
- 薄煤层充填开采超高水材料配比及充填工艺优化 李西凡,熊祖强,王 隼,孙亚鹏,姜 涛(162)
- 不同煤厚条件下切顶卸压无煤柱自成巷技术应用 高玉兵,甄恩泽,马资敏,王亚军(168)

## 分析·探讨

- 下保护层开采上覆煤岩层卸压效果研究 邓广哲,付英凯,杨 东(174)
- 大间距上保护层重叠开采卸压效果研究 寇建新,张晋京,孙矩正,周 洋,孙维吉(179)
- 二连盆地吉尔嘎朗图凹陷煤储层物性及煤层气资源有利区评价 王 涛,邓 泽,胡海燕,吴 松,范文田(187)
- 超临界 CO<sub>2</sub> 作用下煤体增透影响因素分析 陈 攀,王泽祺(192)
- 基于通风量与推进度的采空区自然发火数值模拟 李生鑫,孙珍平,刘春刚(196)
- 巨厚红层下厚煤层露头区开采防水煤柱留设 谢华东(201)
- 深部急倾斜煤层开采灾害防控及力学行为研究 王 宁(205)
- 双斜大倾角综放工作面顶煤冒放性研究 张 蓓,阳元中(211)
- 矿井避难硐室 CO 净化效果检测 王 沉,朱获天,张明清(217)
- 大倾角煤层长壁伪俯斜采场围岩应力演化及顶板破断特征 伍永平,刘旺海,解盘石,田双齐(222)
- 不同回采方式下地表沉降特征 UDEC 数值分析 柳昭星(228)
- 短壁充填巷道宽高比对围岩稳定性的影响研究 宋天奇,朱 磊,刘治成,古文哲,潘 浩,张新福,秋丰岐,宋立平(235)
- 震动波触发巷道动力失稳响应特征数值分析 吕鹏飞,刘天奇,包鑫阳,李绪萍(240)

## 监察·管理

- 兴隆庄煤矿职工行为隐患分析及 SAE 闭环管理体系研究 周 波,栾建伟,毛玉飞,于岩斌,姜爱伟(245)
- 基于 DEA 的煤矿职业健康管理效率评价研究 李春贺(250)
- 基于两阶段 DEA 模型的煤炭企业绿色开采效率研究 侯 荡,梁志霞(255)
- 基于长短期记忆网络的矿工不安全行为研究 鞠春雷,聂方超,刘文岗,郭金山,张江石(260)

# CONTENTS

## Test·Research

- Effect of Pore Fractal Characteristics of Gas Coal on Gas Adsorption **LIU Jikun,LI Chengzhu,WANG Cuixia(1)**
- Experimental Study on Pressure Relief Gas Extraction of Goaf with Large Diameter Borehole in High Gas Close Distance Coal Seams  
**SHAO Guoan,ZOU Yongming(6)**
- Effect of Electric Potential Gradient on Methane Adsorption and Desorption Behaviors in Lean Coal Modified by Electrochemical Treatment  
**ZHANG Xiaoyu,KANG Tianhe,ZHANG Runxu,ZHANG Bin,KANG Guanxian,ZHANG Liankun(11)**
- Sensitivity Analysis of Influence of Many Factors on Coal Permeability Under Non-isostatic Deviating Stress  
**ZHANG Yaqi,PENG Wenqing(16)**
- Influence of Different Geological Structures in Yangquan Mining Area on Outburst-related Physical Parameters of Coal  
**LINGHU Jianshe,YAN Zhiming,XU Chao(20)**
- Experimental Study on Air-drying Heat and Spontaneous Combustion Characteristics of Hydrated Coal  
**DONG Ziwen,PI Zikun,LUO Chen,PENG Bin,MENG Liping,WEI Shilong(24)**
- Preparation and Properties of a Novel Coal Dust Inhibitor with Cross-linked Network Structure  
**HUANG Xueman,DING Guanghui,ZHANG Qian,LU Wei(30)**
- Study on Applicability of Different Desorption Formulas to Gas Desorption of Mixed Particle Coal  
**LI Xiulei(35)**
- Preparation and Properties of High Water Filling Material for Coal Gasification Slag  
**XU Yang,XU Zaigang,XIE Hongfei,LI Cuiqin,CAO Yang,CHEN Qianlin(41)**
- Study on Micro-pores Characteristics of Coking Coal Under Long-term Gas Action  
**NIU Wenxing,FENG Zijun,YANG Yifan,WAN Zhijun(47)**
- Study on Reasonable Location of Top and Bottom Extraction Roadway of Confined Water Based on High Precision Micro-seismic Monitoring  
**YU Chunsheng,ZHAI Changzhi(52)**
- Study on Evolution and Subsidence Fractal Characteristics of Overlying Strata in Thick Loose Layers and Thin Bedrocks  
**GUO Longhui,CHENG Hua,PENG Shilong,FU Baojie(59)**
- Aeolian Sand Paste Filling Material Ratio Based on Repeated Orthogonal Test  
**CAO Xiaofan,TANG Yichuan,DENG Niandong,SHANG Hui,WANG Yi(65)**

## Technology·Innovation

- Butted Technology Between Underground Directional Drilling Borehole and Vertical Well of Surface U-type Well Group  
**YANG Junzhe,JIN Xin,GENG Zengyang(71)**
- Collaborative Prevention and Control Technology of Coal Spontaneous Combustion in Goaf Under the Influence of High Pumping Alley  
**XING Lijie,LIU Fen,JIN Yan,SONG Yushan,GUO Jun(75)**
- Air Leakage Technology of Micro Positive Pressure Sealing by Nitrogen Injection in Connection Roadway  
**LIU Zhongquan,WANG Wei(81)**
- Control Technology of Coal Spontaneous Combustion Fire in Complicated Surroundings  
**CAO Kai(85)**
- Prevention and Control Technology of Rock Burst in Roadway Excavation in Irregular Remaining Coal Pillar Area Adjacent to Goaf Side  
**DONG Jingyuan,XUE Chengchun,CAO Anye,BAI Xianxi,GU Yu,ZHOU Changfeng(89)**
- Treatment Technology of Roof Watering in Ditch Driving Roadway of Shallow Coal Seam  
**GAO Bin,JI Zhongkui,YANG Fan,ZHANG Chi,REN Zhizhi,LUO Ankun,XUE Xiaoyuan(94)**

## Design·Development

- A Device for Straight Drilling of Coal Mine Gas Extraction Borehole  
**DUAN Zhiguo(98)**
- A State Sensor for Air Door of Main Fan in Coal Mines  
**CHENG Yulong,WANG Zuxun(101)**
- Automatic Control Air Conditioning System of Shutter Wind Window in Tangshan Mine  
**SU Peiyang,ZHU Lingqi,ZHANG Jiayong,ZHOU Yiting(104)**
- Study on Mechanism of Rock Core Plugging at Bottom of PDC Reverse Circulation Coring Bit for Nearly Horizontal Hole  
**TANG Shengli,FANG Jin,LI Quanxin,LIU Jianlin,ZHAO Jiangpeng(108)**
- Mine Gas Chromatograph Based on Network Remote Control  
**ZHANG Junjie(114)**
- Long Distance Intrinsically Safe Power Supply Technology in Coal Mines  
**LIU Yahui(118)**
- Large Diameter and Fast Plug-in Type Spiral Drill Pipe for Drilling Down Screen Pipe Without Lifting  
**YANG Huwei(122)**

- ZDY2-300LM Full Hydraulic Drilling Rig with Double Working Arms **SHAO Junjie,ZHANG Ning(126)**
- Study on Pressure Release Performance of a New Type of Anchor Cable Pressure Release Device **WU Yuyi(130)**
- Safety Requirements of Refuge Chamber in Underground Coal Mines **SHI Zhiyuan,PING Lihua,YUAN Xiaoming(134)**
- Trajectory Control Technology of Bedding Drilling in Medium Thick Coal Seam **DONG Haichao,ZHAO Yongzhe(137)**
- Design of a New Anti-car-running Barrier in Underground Coal Mine **SUN Debiao,ZHENG Yi,YANG Ailan,QIU Deyi,CHEN Yong(140)**

### **Application·Practice**

- Application of KJ768 Micro-seismic Monitoring System in Early Warning of Strong Mine Pressure Disaster in High Gassy Mines  
**ZHANG Guanghui,DENG Zhigang,JIANG Junjun,AN Yujia(144)**
- New Rapid Sealing Material of Deep Hole Blasting and Its Process  
**LU Xiaorong,LI Xifan,XIONG Zuqiang,HU Yachao,WANG Yan(148)**
- Reinforcement and Toughening of Polyurethane Reinforcement Materials and Engineering Application  
**PAN Shuqi,LIU Lizong,GUO Jianwei,WANG Yuchao,YU Xiaofeng,BAI Guangfeng,YU Guang,SUN Gang(153)**
- Advanced Support Technology for Large Section Roadway in Thick Coal Seam **GUO Wenbin,MA Chuanbin,SONG Wenjie(157)**
- Super High-water Material Ratio and Optimization of Filling Technology in Thin Coal Seam Filling Mining  
**LI Xifan,XIONG Zuqiang,WANG Yan,SUN Yapeng,JIANG Tao(162)**
- Application of Nonpillar Mining Technique with Automatically Formed Entry by Roof Cutting and Pressure Release Under Different Coal Seam Thicknesses  
**GAO Yubing,ZHEN Enze,MA Zimin,WANG Yajun(168)**

### **Analysis·Discussion**

- Study on Pressure Relief Effect of Overlying Coal and Rock Mass in Mining Under Protective Layer  
**DENG Guangzhe,FU Yingkai,YANG Dong(174)**
- Pressure Relief Effect of Overlapping Mining of Upper Protective Layer with Large Spacing  
**KOU Jianxin,ZHANG Jinjing,SUN Juzheng,ZHOU Yang,SUN Weiji(179)**
- Evaluation of Coal Reservoir Property and Favorable Area of Coalbed Methane Resources in Jiergalangtu Depression of Erlan Basin  
**WANG Tao,DENG Ze,HU Haiyan,WU Song,FAN Wentian(187)**
- Influencing Factors Analysis of Coal Permeability Improvement Under the Action of Supercritical CO<sub>2</sub> **CHEN Pan,WANG Zeqi(192)**
- Numerical Simulation of Spontaneous Combustion in Goaf Based on Ventilation and Advancing Degree  
**LI Shengxin,SUN Zhenping,LIU Chungang(196)**
- Design on Waterproof Safety Coal Pillar at Outcrop Area of Thick Coal Seam Under the Large Thick Jurassic Red Stratum  
**XIE Huadong(201)**
- Study on Prevention and Control of Mining Disaster and Mechanical Behavior of Deep Steep Coal Seam **WANG Ning(205)**
- Study on Caving Property of Top Coal in Fully Mechanized Caving Face with Double Inclined and Large Dip Angle  
**ZHANG Bei,YANG Yuanzhong(211)**
- Detection of CO Purification Effect in Mine Refuge Chamber **WANG Chen,ZHU Huotian,ZHANG Mingqing(217)**
- Stress Evolution and Roof Breaking Characteristics of Surrounding Rock in Oblique Longwall Mining Area of Steeply Dipping Seam  
**WU Yongping,LIU Wanghai,XIE Panshi,TIAN Shuangqi(222)**
- UDEC Numerical Analysis for Surface Subsidence Characteristics Under Different Mining Methods **LIU Zhaoxing(228)**
- Influence of Width to Height Ratio on Surrounding Rock Stability for Short Wall Backfilling Roadway  
**SONG Tianqi,ZHU Lei,LIU Zhicheng,GU Wenzhe,PAN Hao,ZHANG Xinfu,QIU Fengqi,SONG Liping(235)**
- Numerical Analysis of Dynamic Instability Response Characteristics in Roadways Triggered by Shock Wave  
**LYU Pengfei,LIU Tianqi,BAO Xinyang,LI Xuping(240)**

### **Supervision·Management**

- Analysis on Hidden Dangers of Staff Behavior in Kinglongzhuang and Research on SAE Closed-loop Management System  
**ZHOU Bo,LUAN Jianwei,MAO Yufei,YU Yanbin,JIANG Aiwei(245)**
- Research on Efficiency Evaluation of Occupational Health Management in Coal Mine Based on DEA **LI Chunhe(250)**
- Research on Green Mining Efficiency of Coal Enterprises Based on Two-Stage DEA Model **HOU Dang,LIANG Zhixia(255)**
- Research on Miners' Unsafe Behavior Based on Long and Short Term Memory  
**JU Chunlei,NIE Fangchao,LIU Wengang,GUO Jinshan,ZHANG Jiangshi(260)**



煤传媒



煤矿安全

中文核心期刊

中国科技核心期刊

RCCSE中国核心学术期刊

美国《化学文摘》收录期刊

美国《乌利希期刊指南》收录期刊

俄罗斯《文摘杂志》收录期刊

# 煤矿安全<sup>®</sup>

MEIKUANG ANQUAN

月刊 (1970年创刊)

第51卷 第9期 总第555期 2020年9月

# SAFETY IN COAL MINES

Monthly (Started in 1970)

Vol.51 No.9 (Series No.555) September 2020

**主管单位** 煤科集团沈阳研究院有限公司  
**主办单位** 煤科集团沈阳研究院有限公司  
**主 编** 梁运涛  
**副 主 编** 梁绍权  
**执行主编** 王福厚  
**编辑部主任** 陈 洋  
**出版单位** 《煤矿安全》编辑部  
**地 址** 辽宁省抚顺市经济开发区滨河路 11 号  
**邮政编码** 113122  
**发行范围** 公开发行  
**发行单位** 《煤矿安全》编辑部或全国各地邮局  
**邮发代号** 8-293  
**印刷单位** 煤炭科学研究总院抚顺分院胶版印刷厂  
**统一社会  
信用代码** 91210400463312350A  
**商标注册证** 第 1144537 号  
**网 址** www.mkaqz.com  
**出版日期** 9 月 20 日

**Supervisor** CCTEG Shenyang Research Institute  
**Sponsor** CCTEG Shenyang Research Institute  
**Editor-in-Chief** LIANG Yuntao  
**Associate Editor-in-Chief** LIANG Shaoquan  
**Executive Editor-in-Chief** WANG Fuhou  
**Editorial Director** CHEN Yang  
**Publisher** Editorial Office of 《SAFETY in COAL MINES》  
**Address** No.11 of Binhe Road, Fushun Economic Development Area, Liaoning, China  
**Post Code** 113122  
**Distribution Range** Public Offering  
**Subscription** Editorial Office of 《SAFETY in COAL MINES》 or Local Post Offices  
**Subscription Code** 8-293  
**Printed by** Offset Printing Factory of Fushun Branch of CCRI  
**Uniform Social Credit Code** 91210400463312350A  
**Trademark Registration Certificate** No.1144537  
**Website** www.mkaqz.com  
**Publication Date** September 20

中国标准连续出版物号:  $\frac{\text{ISSN } 1003-496X}{\text{CN } 21-1232/\text{TD}}$   
 国内定价: 25.00 元

电 话: (024) 56616988 56616987 56616981  
 电子邮箱: mkaq@163.com 北京联络处: (010) 64464228