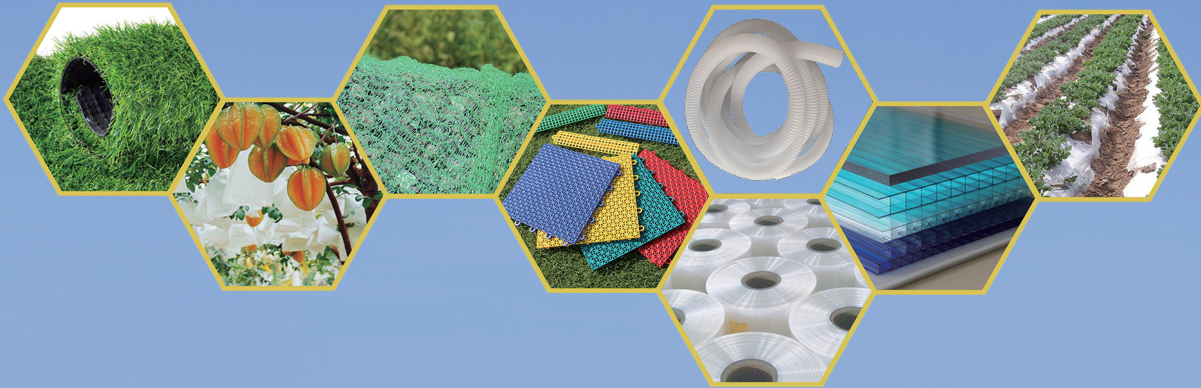


CHEMCHINA  
BLUESTAR

抗老化  
STARSHINE





# 合成材料老化与应用

HECHENG CAILIAO LAOHUA YU YINGYONG

(经国家科委、新闻出版署批准国内外公开发行)

双月刊

2021 年第 50 卷第 6 期

1972 年创刊

总计 222 期

主管、主办:广州合成材料研究院有限公司

协 办:广东省复合材料学会

主 编:杨育农

编辑、出版:《合成材料老化与应用》编辑部

国内发行:广州市邮政局

国内邮发代号:46-306

国内订阅:全国各地邮局

海外总发行:中国国际图书贸易集团有限公司

(北京 399 信箱)

海外发行代号:BM1861

编辑部地址:广州市天河区车陂西路 396 号

邮码:510665

电话:(020)32373461;(020) 32373461(传真)

网址:<http://www.hccllhyyy.com>

E-mail:hccllhyyy@163.com

hccllhyyy@126.com

QQ: 441438064 在线投稿

刊号: ISSN1671-5381  
CN44-1402/TQ

出版日期:2021 年 12 月 30 日

印刷:广州市新齐彩印刷有限公司

全年定价:120 元

开 户 行:建设银行广州员村支行

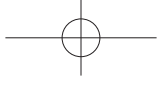
户 名:广州合成材料研究院有限公司

账 号:44001470503053002499

## 目 次

### • 试验与研究 •

- 改性水滑石对聚氯乙烯压延膜的耐老化性能影响  
.....胡俊峰, 胡建华, 李 艳, 李文彬, 刘 平(1)
- PVC 压延膜耐老化性能研究  
.....胡建华, 李文彬, 胡俊峰, 李 艳, 刘 平(5)
- 特高压输电用复合绝缘子 HTV 硅橡胶的耐候性能变化研究  
.....范银婷, 吴舜娟, 林利宏, 冯志新, 李蓬烈, 陈俊枫(8)
- 废旧 PET 回收料的流变性能研究  
.....马俊滨, 邢玉静, 郭熙桃, 严玉蓉(12)
- SBS 改性沥青高温存储过程中性能衰减机理的研究  
.....王改霞, 董夫强, 姜萌萌, 宋立飞, 王进成(15)
- NX8000K/HPN-68L 成核剂复配对等规聚丙烯性能改性的影响  
.....张 荣, 罗发亮, 路宝翠, 王 齐, 张 宇, 胡 琳, 王 林(19)
- 有机蛭石 / 高密度聚乙烯复合材料的制备及性能研究  
.....浦行佳, 徐 伟, 陆毅峰, 袁壮志(22)
- 聚硅氧烷接枝聚苯乙烯乳液的合成及热性能研究  
.....张雪萍, 王秋龙, 孟凡磊, 马凤国, 刘春霞(25)
- 热氧老化对 10kV 环网柜环氧基电缆套管材料性能影响  
.....周宇通, 张 杰, 赵洲峰, 莫金龙, 蔡金明, 裘吕超, 鲁旷达, 徐冬梅, 金江舟(28)
- 抗 UV 剂对双组份标线涂料耐久性的影响研究  
.....司晶晶, 邢苗苗, 王俊彦, 陈书霞, 邹晓勇, 吴闻秀(31)
- 基于 DSC-SSA 鉴别低密度聚乙烯再生料  
.....孙梦捷, 王永香, 刘 峻(34)
- 螺 [9H- 芴 -9,9'-[9H] 氧杂蒽 ]-2- 硼酸频哪醇酯的合成与表征  
.....杨振强, 王 会, 李国防, 李 瑞, 屈凤波(36)
- 电力电缆缓冲层烧蚀故障分析及试验研究.....  
李文杰, 欧阳本红, 宋鹏先, 刘松华, 张振鹏, 王昱力, 邓显波(38)
- 不同方法检验标准物质定值可疑值的探究  
.....刘俊保, 黄世英, 张力方, 曹帅英(42)
- 含电气石锌硼酸盐玻璃负离子释放量.....  
吴旭明, 冯福山, 孔儒豪, 吴锦绣, 胡艳宏, 柳召刚, 王冕堂(45)
- 装配式一体化内龙骨夹芯围护墙板抗火性能研究  
.....盛学庆, 徐庆锋, 潘胜军, 徐平凡, 曾 聪(49)
- 差示扫描量热法测定高纯度硬脂酸凝固点  
.....贾慧青, 李晓银, 杨 芳(53)
- 磺化聚苯并咪唑 - 聚醚砜高温复合质子交换膜的制备及性能研究  
.....邹 静, 崔秋娟, 杨艳丽, 马少华(55)
- 老化沥青再生性能的影响因素研究.....陈镇熙(59)
- SBS 改性沥青混合料最佳油石比优化试验研究.....范 泽(62)
- 瓦斯水合物密闭常温分解过程温度场分布特征  
.....陈文胜, 侯凤才, 吴 琼, 刘传海, 王洪梁(65)
- 给排水安装工程用低塑性聚氯乙烯管材制备研究.....王飞腾(69)
- 高层建筑 CFRP 加固钢筋混凝土柱结构抗震性能研究.....李 培(72)
- 离子液体表面分子印迹聚合物制备研究.....李 宁(75)



## 第六届编委会成员名单

主任:丁冰晶

副主任:杨育农(主编)

委员:(排名不分先后)

麦堪成 赵建青 涂伟萍

廖兵 周长忍 苑会林

杨明山 陈宇 李杰

彭松 冯嘉春 陈国华

乔金梁 宁凯军 曹建芳

陈启明 丁军 吴茂英

傅轶 叶家灿 麦裕良

谢宇芳 王浩江 铁文安

### 声明

为适应我国信息化建设需要,扩大作者学术交流渠道,本刊已加入“万方数据——数字化期刊”、《中国核心期刊(遴选)数据库》、“中国期刊”和《中国科技期刊数据库》等,并由其机构对外提供信息服务,相关著作权使用费与本刊合并一次性给付。作者如不同意著作权被数据库等第三方使用,请在来稿时声明,全刊将做适当处理。谢谢!

水热法制备  $\text{Ho}^{3+}/\text{Y}^{3+}$  共掺  $\text{BaTiO}_3$  基粉体及其介电性能研究...杨殿来,张莹莹,刘坤,刘博,段同飞,孙连来,许成,薛健,许壮志(78)  
橡胶粉对摩擦材料性能的影响研究

.....张豪,侯彩红,郭雪芳(81)  
城轨车辆用胶粘剂性能的影响因素研究

.....介艳良,郝磊,闫树军,赵翔彦,张学礼(84)  
PCB基多级孔碳/聚苯胺复合材料的制备及性能研究...聂莹(87)

装配式建筑拼装接缝用胶泥材料制备.....马琳(90)  
激光-MAG复合焊接工艺及焊接接头性能分析...赵孔标,李利娜(93)

高分子复合材料的制备及阻燃性能研究.....高燕(97)  
基于不同环境的氟橡胶O形密封圈失效行为

.....李玉,李璐,徐伟,李婵(100)  
基于水热合成技术的建筑废料再利用研究.....申琳,李晓刚(102)

### · 专论与综述 ·

国内外聚乙烯(PE)管材专用料的开发及市场应用概述

.....姜慧婧,胡琳,王齐,王林,路宝翠,崔奋为(104)  
基于界面黏附理论的沥青与集料黏附特性研究进展

.....马祥辉,杨振宇,樊亮,胡家波,李永振(108)  
轨道交通涂层抗石击碎裂性检测的探讨

.....范星,李欣,彭金墩,李标,袁昌浩(112)  
增亮膜国产化产业化所选技术及其展望.....梁明礼(115)

铁路减振橡胶制品动静刚度比研究进展  
.....朱万超,贺春江,陈传志,张宪清(117)

煤炭间接液化生产喷气燃料的发展现状与展望  
.....段永亮,王慧琴,张静,张安贵,安良成(121)

方兴未艾的超分子化学及应用.....赵征(125)  
基于风机叶片用玻璃纤维复合材料研究发展.....吴培华(128)

植根深远的大环化学及应用.....陈瑜(131)  
纤维增强复合材料跟随新能源汽车的同步发展研究.....王华龙(134)

玻璃幕墙材料对保温节能的影响.....李瑜(137)  
超高性能混凝土在桥梁工程中的应用

.....马斌,陈晓飞,丁志文,陈利,李斌成(139)  
高分子材料在室内装修与设计中的应用研究.....丁源(142)

体育运动场地用合成材料面层的冲击吸收性能研究.....杜逸帆(144)  
基于循环经济的废旧塑料制品材料的再生利用.....杜雨潇(147)

室内空间装饰装修设计中的合成塑料研究与应用.....吴潮玮(150)  
碳纤维复合材料动态力学性能对运动器械的影响研究...陈盼盼(152)

骨科可降解镁合金生物材料的研究进展.....李玉国(155)  
桥梁加固中碳纤维材料的应用.....谢群(159)

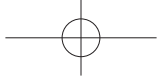
关于复合材料-土建结构的力学特性与加固技术探究...霍军(162)  
高分子材料在美术绘画媒介中的应用.....彭锦辉(165)

生物降解淀粉基塑料老化性能研究综述.....金玉洁(168)  
轮胎隔震垫力学性能试验与分析.....冯帆(171)

### · 信息与动态 ·

华峰集团年产60万吨可降解塑料项目签约(174) 环状聚烯烃列入国家重点研发计划(174) 大庆石化超高收缩纤维试产成功(174) 合成树脂行业“十四五”发展(175) 专利文摘(176)

《合成材料老化与应用》2021年总目录.....(177)



**SYNTHETIC MATERIALS AGING AND APPLICATION**  
(HECHENG CAILIAO LAOHUA YU YINGYONG)

Vol. 50, No.6, December, 2021  
Established in 1972 Series No. 222

**Bimonthly**

**Worldwide Distribution**

**Sponsor:**

Guangzhou Synthetic Materials  
Research Institute Co., Ltd.

**Editor and Publisher:**

The "Synthetic Materials Aging and  
Application" Editorial Office

**Overseas Distributor:**

China International Book Trading  
Corporation (P O Box 399 Beijing)

**Distributor No :** BM1861

**Chief Editor :**

YANG Yu-nong

**Address :**

No. 396 Chebei West Road, Tianhe district,  
Guangzhou, Guangdong province, China

**Post Code :**

510665

**MAIN CONTENTS**

Effect of Modified Hydrotalcite on Aging Resistance of PVC Extension Film  
.....HU Jun-feng, HU Jian-hua, LI Yan, LI Wen-bin, LIU Ping(1)

Study on Aging Resistance of PVC Calendered Film  
.....HU Jian-hua, LI Wen-bin, HU Jun-feng, LI Yan, LIU Ping(5)

Study on Weatherability of HTV Silicone Rubber Composite Insulator for  
UHV Transmission.....FAN Yin-ting,  
WU Shun-juan, LIN Li-hong, FENG Zhi-xin, LI Peng-lie, CHEN Jun-feng(8)

Study on Rheological Properties of Waste PET Recycled Materials  
.....MA Jun-bin, XING Yu-jing, GUO Xi-tao, YAN Yu-rong(12)

Study on Performance Attenuation Mechanism of SBS Modified  
Asphalt during High Temperature Storage.....WANG Gai-xia, DONG  
Fu-qiang, JIANG Meng-meng, SONG Li-fei, WANG Jin-cheng(15)

Effect of NX8000K/HPN-68L Nucleating Agent Compound on iPP  
Performance Modification.....ZHANG Rong, LUO  
Fa-liang, LU Bao-cui, WANG Qi, ZHANG Yu, HU Lin, WANG Lin(19)

Preparation and Properties of Organic Vermiculite/High Density Polyethylene  
Composites.....PU Xing-jia, XU Wei, LU Yi-feng, YUAN Zhuang-zhi(22)

Synthesis and Thermal Properties of Polysiloxane Grafted Polystyrene  
Emulsion.....ZHANG Xue-ping,  
WANG Qiu-long, MENG Fan-lei, MA Feng-guo, LIU Chun-xia(25)

Influence of Thermal Oxidative Aging on the Properties of 10kV Ring Main  
Unit Epoxy-based Insulator.....  
ZHOU Yu-tong, ZHANG Jie, ZHAO Zhou-feng, MO Jin-long, CAI Jin-  
ming, QIU Lv- chao, LU Kuang-da, XU Dong-mei, JIN Jiang-zhou(28)

Influence of Anti-UV Agent on Durability of Two-component Marking  
Coating.....SI Jing-jing, XING Miao-miao,  
WANG Jun-yan, CHEN Shu-xia, ZOU Xiao-yong, WU Wen-xiu(31)

Identification of Low-density Polyethylene Recycled Materials Based on  
DSC-SSA.....SUN Meng-jie, WANG Yong-xiang, LIU Jun(34)

Synthesis and Characterization of 2'-(4,4,5,5-Tetra methyl-1,3,2- dioxaborolan-  
2-yl)-spiro[9H-fluorene-9,9'-[9H]xanthene].....  
YANG Zhen-qiang, WANG Hui, LI Guo-fang, LI Rui, QU Feng-bo(36)

Analysis and Experimental Study on Erosion Failure of Cushion Layer of  
Power Cable.....LI Wen-jie, OUYANG Ben-hong, SONG Peng-xian,  
LIU Song-hua, ZHANG Zhen-peng, WANG Yu-li, DENG Xian-bo(38)

The Study of Different Methods for Testing Dubious Value of Fixed Value  
of Standard Material.....  
LIU Jun-bao, HUANG Shi-ying, ZHANG Li-fang, CAO Shuai-ying(42)

Negative Ion Release from Zinc Borate Glass Containing Tourmaline  
.....WU Xu-ming, FENG Fu-shan, KONG  
Ru-hao, WU Jin-xiu, HU Yan-hong, LIU Zhao-gang, WANG Mi-tang(45)

Study on Fire Resistance of Sandwich Inner Keel Wallboard of Prefabricated  
Enclosure System.....SHENG  
Xue-qing, XU Qing-feng, PAN Sheng-jun, XU Ping-fan, ZENG Cong(49)

Determination of Solidification Point of High Purity Stearic Acid by Differential  
Scanning Calorimetry.....JIA Hui-qing, LI Xiao-yin, YANG Fang(53)

Study on the Preparation and Performance of Sulfonated Polybenzimidazole-  
Polyethersulfone High Temperature Composite Proton Exchange  
Membranes...ZOU Jing, CUI Qiu-juan, YANG Yan-li, MA Shao-hua(55)

Study on Influencing Factors of Regeneration Performance of Aged  
Asphalt.....CHEN Zhen-xi(59)



Experiment and Investigation on the Optimum Asphalt Aggregate Ratio of SBS Modified Asphalt Mixture.....FAN Ze(62)

The Distribution Characteristics of Temperature Field of Methane Hydrate Dissociation Process in Closed Room Temperature  
.....CHEN Wen-sheng, HOU Feng-cai, WU Qiong, LIU Chuan-hai, WANG Hong-liang(65)

Study on Preparation of Low Plasticity PVC for Water Supply and Drainage Installation Engineering.....WANG Fei-teng(69)

Study on Seismic Behavior of Reinforced Concrete Column Strengthened with CFRP of High Building.....LI Pei(72)

Preparation of Molecularly Imprinted Polymers on Ionic Liquids.....LI Ning(75)

Hydrothermal Synthesis and Investigation on Dielectric Properties of Ho<sup>3+</sup>/Y<sup>3+</sup> Co-doped BaTiO<sub>3</sub> Powders.....  
YANG Dian-lai, ZHANG Ying-ying, LIU Kun, LIU Bo, DUAN Tong-fei, SUN Lian-lai, XU Cheng, XUE Jian, XU Zhuang-zhi(78)

Study on the Performance Influence of Rubber Powders on the Properties of Friction Materials  
.....ZHANG Hao, HOU Cai-hong, GUO Xue-fang(81)

Study on Influencing Factors of Adhesive Properties for Urban Rail Vehicles  
.....JIE Yan-liang, HAO Lei, YAN Shu-jun, ZHAO Xiang-yan, ZHANG Xue-li(84)

Preparation and Properties of PCB Based Multi Porous Carbon / Polyaniline Composites.....NIE Ying(87)

Preparation of Mastic Materials for Assembly Joints of Prefabricated Buildings.....MA Lin(90)

Welded Joint Organization Performance Analysis on Laser-MAG Hybrid Welding.....ZHAO Kong-biao, LI Li-na(93)

Study on Preparation and Flame Retardant Properties of Polymer Composites.....GAO Yan(97)

Failure Behavior of Fluororubber O-ring Seals Based on Different Environments.....LI Yu, LI Lu, XU Wei, LI Chan(100)

Research on Reuse of Construction Waste Based on Hydrothermal Synthesis Technology.....SHEN Lin, LI Xiao-gang(102)

The Development and Application of Special Materials for Polyethylene Pipe Home and Abroad  
.....JIANG Hui-jing, HU Lin, WANG Qi, WANG Lin, LU Bao-cui, CUI Fen-wei(104)

Research Progress on Adhesion Characteristics of Asphalt and Aggregate Based on Interfacial Adhesion Theory  
.....MA Xiang-hui, YANG Zhen-yu, FAN Liang, HU Jia-bo, LI Yong-zhen(108)

Discussion on the Detection of the Resistance to Rock Fragmentation of Rail Transit Coatings  
.....FAN Xing, LI Xin, PENG Jin-dun, LI Biao, YUAN Chang-hao(112)

Selected Technologies and Prospects of Domestic Industrialization of Brightness Enhancement Film.....LIANG Ming-li(115)

Research Progress on Dynamic-static Stiffness Ratio of Rubber Products for Railway Vibration Absorption  
.....ZHU Wan-chao, HE Chun-jiang, CHEN Chuan-zhi, ZHANG Xian-qing(117)

Development Status and Prospects of Indirect Coal Liquefaction to Produce Jet Fuel  
.....DUAN Yong-liang, WANG Hui-qin, ZHANG Jing, ZHANG An-gui, AN Liang-cheng(121)

In the Ascendant of Supramolecular Chemistry and Its Applications.....ZHAO Zheng(125)

Research and Development of Glass Fiber Composites for Wind Turbine Blades.....WU Pei-hua(128)

Flourishing Development in Macrocyclic Chemistry.....CHEN Yu(131)

Research on the Synchronous Development of Fiber Reinforced Composites with New Energy Vehicles.....WANG Hua-long(134)

Effect of Glass Curtain Wall Materials on Heat Preservation and Energy Saving.....LI Yu(137)

Application of Ultra High Performance Concrete in Bridge Engineering  
.....MA Bin, CHEN Xiao-fei, DING Zhi-wen, CHEN Li, LI Bin-cheng(139)

The Application of Polymer Materials in Interior Decoration and Design.....DING Yuan(142)

Research on Impact Absorption Performance of Synthetic Material Surface Layer for Sports Field.....DU Yi-fan(144)

Recycling of Waste Plastic Products and Materials Based on Circular Economy.....DU Yu-xiao(147)

Research and Application of Synthetic Plastics in Interior Space Decoration Design.....WU Chao-wei(150)

Effect of Dynamic Mechanical Properties of Carbon Fiber Composites on Sports Equipment.....CHEN Pan-pan(152)

Development in Orthopedic Degradable Magnesium Alloy Biomaterials.....LI Yu-guo(155)

Application of Carbon Fiber Materials in Bridge Reinforcement.....XIE Qun(159)

Research on Mechanical Characteristics and Reinforcement Technology of Composite Civil Structure.....HUO Jun(162)

Application and Analysis Based on Polymer Materials in Art Painting Media.....PENG Jin-hui(165)

Review on Study of Aging Properties of Biodegradable Starch Based Plastics.....JIN Yu-jie(168)

Study on the Mechanical Properties of Tire Isolation Cushion.....FENG Fan(171)