

第 49 卷 第 7 期 2020 年 7 月

## 目 次

· 特邀综述 ·

- PVT 法 AlN 单晶生长技术研究进展及其面临挑战 ..... 付丹扬, 龚建超, 雷丹, 黄嘉丽, 王琦琨, 吴亮 (1141)

· 研究论文 ·

**氮化镓籽晶的表面损伤处理及氨热生长研究**

- ..... 姚晶晶, 任国强, 李腾坤, 苏旭军, 邱永鑫, 许磊, 高晓冬, 徐科 (1157)

**PVT 法坩埚系统中自发生长自支撑 AlN 单晶及其表征分析**

- ..... 龚建超, 朱如忠, 刘欢, 王琦琨, 李哲, 张刚, 吴亮 (1162)

**行星式 MOCVD 反应器进口结构对 AlN 生长的气相反应和生长速率的影响** ..... 茅艳琳, 左然 (1168)

**硫脲掺杂金刚石的高温高压合成及 FT-IR 光谱研究** ..... 李勇, 廖江河, 王应, 陈宁, 余彦超 (1176)

**人造金刚石的微观结构模型** ..... 黄海芳, 黄凯, 谷继腾, 方克明 (1180)

**背电极面积优化对非晶硅太阳能电池的影响** ..... 何光强, 魏欣, 张敏, 安辛友, 龚利平, 曾体贤 (1187)

**核壳结构  $\text{NaY}(\text{MoO}_4)_2:\text{Eu}^{3+}$  @  $\text{SiO}_2$  的制备及上转换发光性能的研究**

- ..... 王雅静, 孙蕊, 肖林久, 郭建 (1195)

**$\text{SiO}_2$  @  $\text{Gd}_2\text{O}_3:\text{Tb}^{3+}$  核壳微球的可控合成及发光性能研究**

- ..... 陈杰, 姜海峰, 高忆欣, 王珊珊, 高艳, 曾晓丹 (1201)

**小尺寸、单分散  $\text{Cd}^{2+}$  掺杂  $\beta\text{-NaLuF}_4:\text{Yb}, \text{Er}$  上转换纳米晶的合成**

- ..... 邓海山, 姚舜, 周月霞, 陈甲, 曹敏驰, 王友法 (1208)

**$\text{Sb}^{5+}$  取代 BNT 基弛豫铁电体的性能研究** ..... 白钦中, 吴文娟, 王涛, 王凤华, 吴波 (1217)

**磁性  $\text{Fe}_3\text{O}_4$  @  $\text{TiO}_2/\text{ZnO}$  的制备及光催化性能研究**

- ..... 赵瑨云, 徐婕, 穆寄林, 胡家朋, 林皓, 付兴平, 刘瑞来 (1223)

**$\text{SnO}_2/\text{TiO}_2$  共掺杂氧化钽基固体电解质的制备和性能研究** ..... 丁爽, 李长久, 姜宏 (1229)

**大面积垂直取向介孔二氧化硅薄膜的制备及性能研究**

- ..... 李若楠, 边慧敏, 张凯, 李朋, 李玉平, 韩培德 (1236)

## 金属有机框架苯丙氨酸铜衍生的氧化铜负极的电化学储锂性能

..... 姚远,侯宏英,刘显茜,田川,孟堃,兰建,徐加雷,冯蒙蒙(1242)

Fe掺杂BN催化CO/SO<sub>2</sub>还原N<sub>2</sub>O的反应机理研究 ..... 王克良,黄禹,施兰,钟晓林,杨太飞,范佳鑫(1246)

两例Ni(II)/Cu(II)配位聚合物的合成、晶体结构及热稳定性研究 ..... 赵娟,刘美玲,葛红光(1252)

一维镉(II)配合物[Cd(H<sub>2</sub>ASA)<sub>2</sub>(H<sub>2</sub>O)<sub>2</sub>]<sub>n</sub>的合成、晶体结构及光致变色性质

..... 邱燕璇,朱铭芙,麦映璇,董鉴辉,潘昊(1258)

新型N-杂环卡宾咪唑盐的合成、表征与抑菌活性研究 ..... 罗杰伟,陈厉丹,赵波,刘军(1264)

艾奇逊炉提纯碳纳米管的组织结构性能表征 ..... 钟良伟,郭纪林,曾志鹏,曾效舒(1272)

正交晶系单晶标准透射电子衍射斑点图及绘制原理 ..... 霍广鹏,陈亮维,胡一丁,张晓东,虞澜(1281)

基于XRD与差热-热重探究Ba<sub>1.55</sub>Ca<sub>0.45</sub>SiO<sub>4</sub>晶体的合成机理 ..... 徐利华(1286)

熔盐辅助碳热还原氮化法制备氮化钽晶须 ..... 张浩然,陈帅峰,陈庆,骆丽杰,李建保,陈拥军(1294)

0.6Ca<sub>0.6</sub>La<sub>0.26</sub>TiO<sub>3</sub>-0.4La(Mg<sub>0.5</sub>Ti<sub>0.5</sub>)O<sub>3</sub>介质陶瓷微波烧结的晶粒生长动力学研究

..... 刘锦,梁炳亮,方财生,何文,张建军,艾云龙(1300)

## ·综合评述·

典型非线性光学晶体生长方法综述 ..... 党君惠,梅大江,吴远东(1308)

超高压材料合成设备的研究进展 ..... 李胜华,李金良,王旭之(1320)

生物质炭的杂元素掺杂及其在电极中的应用 ..... 覃爱苗,郑爽,魏立学,刘志森(1326)

介孔ZSM-5沸石的合成研究进展 ..... 谭可心,蒋迪(1336)

## ·封面图片·

超宽禁带半导体材料——氮化铝单晶 ..... (1346)

# JOURNAL OF SYNTHETIC CRYSTALS

Vol. 49, No. 7      July 2020 ( Series No. 261 )

## CONTENTS

Research Progress and Future Challenges of AlN Single Crystal Growth by Physical Vapor Transport Method

..... FU Danyang, GONG Jianchao, LEI Dan, HUANG Jiali, WANG Qikun, WU Liang(1141)

Study on Surface Damage Treatment of GaN Seed and Ammonothermal Growth

..... YAO Jingjing, REN Guoqiang, LI Tengkun, SU Xujun, QIU Yongxin, XU Lei, GAO Xiaodong, XU Ke(1157)

Growth and Characterization of Freestanding AlN by PVT Method under Tungsten Crucible System

..... GONG Jianchao, ZHU Ruzhong, LIU Huan, WANG Qikun, LI Zhe, ZHANG Gang, WU Liang(1162)

Influence of Inlet Structure of Planetary Reactor on Gas Reaction Path and Growth Rate in AlN-MOCVD

..... MAO Yanlin, ZUO Ran(1168)

Synthesis of Diamond Crystal with  $\text{CH}_4\text{N}_2\text{S}$  Additive at HPHT Conditions and the Study of FT-IR Spectra

..... LI Yong, LIAO Jianghe, WANG Ying, CHEN Ning, SHE Yanchao(1176)

Microstructure Model of the Synthetic Diamond Grains ..... HUANG Haifang, HUANG Kai, GU Jiteng, FANG Keming(1180)

Influence of Back Electrode Area Optimization on a-Si Solar Cells

..... HE Guangqiang, WEI Xin, ZHANG Min, AN Xinyou, GONG Liping, ZENG Tixian(1187)

Research on Synthesis and Up-conversion Luminescence of Core-Shell  $\text{NaY}(\text{MoO}_4)_2:\text{Eu}^{3+}$  @  $\text{SiO}_2$

..... WANG Yajing, SUN Rui, XIAO Linjiu, GUO Jian(1195)

Controllable Synthesis and Luminescent Properties of  $\text{SiO}_2$  @  $\text{Gd}_2\text{O}_3:\text{Tb}^{3+}$  Core-Shell Microspheres

..... CHEN Jie, JIANG Haifeng, GAO Yixin, WANG Shanshan, GAO Yan, ZENG Xiaodan(1201)

Synthesis of Small-size, Monodisperse  $\text{Cd}^{2+}$ -doped  $\beta\text{-NaLuF}_4:\text{Yb}, \text{Er}$  Up-conversion Nanocrystals

..... DENG Haishan, YAO Shun, ZHOU Yuexia, CHEN Jia, CAO Minchi, WANG Youfa(1208)

Study on the Properties of  $\text{Sb}^{5+}$  Substituted BNT Based Relaxor Ferroelectrics

..... BAI Qinzhen, WU Wenjuan, WANG Tao, WANG Fenghua, WU Bo(1217)

Preparation and Photocatalytic Property of Magnetic  $\text{Fe}_3\text{O}_4$  @  $\text{TiO}_2/\text{ZnO}$

..... ZHAO Jinyun, XU Jie, MU Jilin, HU Jiapeng, LIN Hao, FU Xingping, LIU Ruilai(1223)

Preparation and Properties of  $\text{SnO}_2/\text{TiO}_2$  Co-doped Tantalum Oxide Based Solid Electrolytes

..... DING Shuang, LI Changjiu, JIANG Hong(1229)

Preparation and Properties of Large Area Vertically Oriented Mesoporous Silica Films

..... LI Ruonan, BIAN Huimin, ZHANG Kai, LI Peng, LI Yuping, HAN Peide(1236)

Lithium Storage Performances of Copper Oxide Derived from Metal-Organic Framework L-phenylalanine Copper

..... YAO Yuan, HOU Hongying, LIU Xianxi, TIAN Chuan, MENG Kun, LAN Jian, XU Jialei, FENG Mengmeng(1242)

Study on the Reaction Mechanism of N<sub>2</sub>O Reduction by CO/SO<sub>2</sub> over Fe-doped BN

..... WANG Keliang, HUANG Yu, SHI Lan, ZHONG Xiaolin, YANG Taifei, FAN Jiaxin(1246)

Synthesis, Crystal Structures and Thermal Stability of Two Ni(II)/Cu(II) Coordination Polymer

..... ZHAO Juan, LIU Meiling, GE Hongguang(1252)

Synthesis, Crystal Structure and Photochromic Property of a One-Dimensional Cd(II) Complex [Cd(H<sub>2</sub>ASA)<sub>2</sub>(H<sub>2</sub>O)<sub>2</sub>]<sub>n</sub> ..... QIU Yanxuan, ZHU Mingfu, MAI Yingxuan, DONG Jianhui, PAN Hao(1258)

Synthesis, Characterization and Antibacterial Activity of Novel N-heterocyclic Carbene Imidazole Salts

..... LUO Jiewei, CHEN Lidan, ZHAO Bo, LIU Jun(1264)

Characterization of Structure and Properties of CNT Purified by Acheson Furnace

..... ZHONG Liangwei, GUO Jilin, ZENG Zhipeng, ZENG Xiaoshu(1272)

Single Crystal Standard Transmission Electron Diffraction Spot Patterns of Orthonormal System and Its Drawing Principle ..... HUO Guangpeng, CHEN Liangwei, HU Yiding, ZHANG Xiaodong, YU Lan(1281)

Exploring the Synthesis Mechanism of the Ba<sub>1.55</sub>Ca<sub>0.45</sub>SiO<sub>4</sub> Crystal Based on the XRD and DTA-TG

..... XU Lihua(1286)

Molten Salt-Assisted Synthesis of Tantalum Nitride Whiskers by Carbothermal Reduction and Nitridation Method

..... ZHANG Haoran, CHEN Shuaifeng, CHEN Qing, LUO Lijie, LI Jianbao, CHEN Yongjun(1294)

Grain Growth Kinetics of 0.6Ca<sub>0.61</sub>La<sub>0.26</sub>TiO<sub>3</sub>-0.4La(Mg<sub>0.5</sub>Ti<sub>0.5</sub>)O<sub>3</sub> Dielectric Ceramics by Microwave Sintering

..... LIU Jin, LIANG Bingliang, FANG Caisheng, HE Wen, ZHANG Jianjun, AI Yunlong(1300)

Review of Growth Method for Typical Nonlinear Optical Crystal

..... DANG Junhui, MEI Dajiang, WU Yuandong(1308)

Research Progress on Ultra-high Pressure Material Synthesis Equipment

..... LI Shenghua, LI Jinliang, WANG Xuzhi(1320)

Heteroelement Doped Biomass Carbon and Its Application in Electrodes

..... QIN Aimiao, ZHENG Shuang, WEI Lixue, LIU Zhisen(1326)

Research Progress on Synthesis of Mesoporous ZSM-5 Zeolite ..... TAN Kexin, JIANG Di(1336)