



姓 名：刘亲壮

学 位：理学博士

职 称：教授

研究方向：功能薄膜及器件

E-mail: qzliu@mail.ustc.edu.cn

### 个人简介：

刘亲壮, 1981年5月出生, 理学博士, 教授, 硕士生导师, 兼职博导, 学术骨干, 相山学者, 美国田纳西大学访问学者。1999.9-2003.7 安徽大学物理系应用物理学专业学士; 2003.9-2009.6 中国科学技术大学合肥微尺度物质科学国家实验室凝聚态物理专业博士; 2009.7 - 至今 淮北师范大学物理与电子信息学院。

主要从事功能氧化物薄膜材料和外延异质结方面的研究, 多年来一直专注新型宽带隙半导体锡酸盐薄膜的制备和性能研究, 制备了高透明和高电导的新型透明导电锡酸盐薄膜, 并通过掺杂、应力等调控手段, 实现了锡酸盐薄膜材料带隙的大范围调控。先后主持国家自然科学基金项目2项, 安徽省自然科学基金2项, 安徽高校自然科学研究重大和重点项目各1项, 安徽省优秀青年人才重点项目1项, 淮北市科技人才培育计划项目1项, 以及安徽省“协同创新中心”子课题1项, 总经费200余万元。先后在 *Appl. Phys. Lett.*, *ACS Appl. Mater. Interfaces*, *Journal of Materials Chemistry C*, *Europhys. Lett.* 等SCI检索刊物上发表学术论文30余篇, 授权国家发明专利1项。2013和2016年获安徽省第七届自然科学优秀论文三等奖, 2012年获校十一五“科研先进个人”称号, 2014年评为校“学术骨干”, 2016年评为校“优秀教育工作者”, 2020年获“相山学者”称号。

### 承担的科研和教学项目：

1. 主持国家自然科学基金面上项目“锡酸盐  $\text{ASnO}_3$  (A=Sr,Ba) 薄膜能带原位应变调控及铁电场效应晶体管的制备研究” (项目编号: 11974127), 2020.01-2023.12;
2. 主持国家自然科学基金青年基金: 钙钛矿结构 Sn 基透明导电膜及异质结的制备与物性研究, 批准号: 11004071, 2010.01-2012.12;
3. 主持安徽省自然科学基金面上基金项目“钙钛矿锡酸盐薄膜结构和物性的应变调控研究”, (项目编号: 2008085MA19), 2020.01-2021.12;
4. 主持安徽省自然科学基金青年项目“过渡金属离子掺杂锡酸盐薄膜的制备与物性研究”, 项目编号: 1408085QA19, 2014.01-2015.12;
5. 主持安徽省高校自然科学基金重大项目 (项目编号: KJ2019ZD40) “新型宽带隙半导体锡酸盐  $\text{ASnO}_3$  (A=Sr,Ba) 薄膜的禁带宽度调控研究”, 2019.01-2021.12;
6. 主持安徽省高校自然科学研究重点项目: “钙钛矿结构  $\text{BaSnO}_3$  及其掺杂薄膜的结构、电输运和磁性质研究”, 项目编号: KJ2015A095, 2015.01-2016.12;
7. 主持安徽省高校优秀青年人才支持计划重点项目, 项目编号: gxyqZD2016110;
8. 主持安徽省协同创新中心开放课题: “高电导 Sn 基透明导电薄膜的制备研究”, 项目编号: XTZX103732015012;
9. 主持淮北市人才培育项目“新型透明导电膜玻璃的研究和制备”, 项目编号: 20130304
10. 主持校级教研项目: 材料物理课程教学改革与实践, 项目批准号: jy14139。

代表论著:

1. Kaifeng Li, Qiang Gao, Li Zhao, Kai Lv, Lichang Yin, **Qin Zhuang Liu\*(通讯)**, Composition dependent mobility and bandgaps in  $(\text{La}_{0.05}\text{Ba}_x\text{Sr}_{0.95-x})\text{SnO}_3$  epitaxial films, *Applied Physics Letters*, 117(7):072101, (2020).
2. Kaifeng Li, Qiang Gao, Li Zhao, **Qin Zhuang Liu\*(通讯)**, Transparent and conductive Sm-doped  $\text{SrSnO}_3$  epitaxial films, *Optical Materials*, 107, 110139, (2020).
3. Kaifeng Li, Qiang Gao, Li Zhao, **Qin Zhuang Liu\*(通讯)**, Electrical and Optical Properties of Nb-doped  $\text{SrSnO}_3$  Epitaxial Films Deposited by Pulsed Laser Deposition, *Nanoscale Research Letters*, 15:164 (2020).
4. Qiang Gao, Kaifeng Li, Li Zhao, Kai Lv, Hong Li, Jinfeng Zhang, Wenhan Du, **Qin Zhuang Liu\*(通讯)**, Wide range bandgap modulation in strained  $\text{SrSnO}_3$  epitaxial films, *Journal of Materials Chemistry C*, 8, 3545-3552, (2020).
5. Qiang Gao, Kaifeng Li, Li Zhao, Kaiyin Zhang, Hong Li, Jinfeng Zhang, and **Qin Zhuang Liu\*(通讯)**, Wide-Range Band-Gap Tuning and High Electrical Conductivity in La- and Pb-Doped  $\text{SrSnO}_3$  Epitaxial Films. *ACS Appl. Mater. Interfaces*, 11, 25605–25612 (2019).
6. Qiang Gao, Kaifeng Li, Kaiyin Zhang, Jinfeng Zhang, and **Qin Zhuang Liu\*(通讯)**, Structure and bandgap nonlinearity in  $\text{BaSn}_{1-x}\text{Ti}_x\text{O}_3$  epitaxial films, *Applied Physics Letters*, 114, 081901 (2019).
7. Hong Li, Hongyan Lu, Shulong Liu, Qiang Li, **Qin Zhuang Liu\*(通讯)**,  $\text{SiO}_2$  shell on ZnO nanoflake arrays for UV-durable superhydrophobicity on Al substrate, *Materials Research Bulletin*, 114, 85-89 (2019).
8. Qiang Gao, Hengli Chen, Kaifeng Li, and **Qin Zhuang Liu\*(通讯)**, Band Gap Engineering and Room-Temperature Ferromagnetism by Oxygen Vacancies in  $\text{SrSnO}_3$  Epitaxial Films, *ACS Appl. Mater. Interfaces*, 32, 27503-27509 (2018).
9. **Qin Zhuang Liu**, Feng Jin, Bing Li, Lei Geng, Structure and band gap energy of  $\text{CaSnO}_3$  epitaxial films on  $\text{LaAlO}_3$  substrate, *Journal of Alloys and Compounds*, 717: 55-61 (2017).
10. **Qin Zhuang Liu**, Feng Jin, Guanyin Gao, Wei Wang, Ta doped  $\text{SrSnO}_3$  epitaxial films as transparent conductive oxide, *Journal of Alloys and Compounds* 717:62-68 (2017).
11. Hong Li, Hongyan Liu, Yushan Li and **Qin Zhuang Liu\*(通讯)**, One-step hydrothermal fabrication and optical properties of ZnO nanoplate, *Modern Physics Letters B*, 31:1750205 (2017).
12. **Qin Zhuang Liu**, Feng Jin, Guanyin Gao, Bing Li, Yongxing Zhang, Qiangchun Liu, Transparent and conductive Ta doped  $\text{BaSnO}_3$  films epitaxially grown on MgO substrate, *Journal of Alloys and Compounds*, 684:125~131 (2016).
13. **Qin Zhuang Liu**, Feng Jin, Jianming Dai, Bing Li, Lei Geng, Jianjun Liu, Effect of thickness on the electrical and optical properties of epitaxial  $(\text{La}_{0.07}\text{Ba}_{0.93})\text{SnO}_3$  thin films, *Superlattices and Microstructures*, 96:205~211 (2016).
14. **Qin Zhuang Liu**, Jianming Dai, Yang Zhang, Hong Li, Bing Li, Zhongliang Liu, Wei Wang,

High electrical conductivity in oxygen deficient BaSnO<sub>3</sub> films, *Journal of Alloys and Compounds*, 655:389~394 (2016).

15. Bing Li, **Qin Zhuang Liu**\*(通讯), Yongxing Zhang, Zhongliang Liu, Lei Geng, Highly conductive Nb doped BaSnO<sub>3</sub> thin films on MgO substrates by pulsed laser deposition, *Journal of Alloys and Compounds*, 680, 343-349 (2016).
16. **Qin Zhuang Liu**, Jianming Dai, Hong Li, Bing Li, Yongxing Zhang, Kai Dai, San Chen, Optical and transport properties of Gd doped BaSnO<sub>3</sub> epitaxial films, *Journal of Alloys and Compounds*, 647:959~964 (2015).
17. **Qin Zhuang Liu**, Bing Li, Hong Li, Kai Dai, Guangping Zhu, Wei Wang, Yongxing Zhang, Guanyin Gao, Jianming Dai, Composition dependence of structural and optical properties in epitaxial Sr(Sn<sub>1-x</sub>Ti<sub>x</sub>)O<sub>3</sub> films, *Japanese Journal of Applied Physics*, 54:031101 (2015).
18. **Qin Zhuang Liu**, Hong Li, Bing Li, Wei Wang, Qiangchun Liu, Yongxing Zhang, Jianming Dai, Structure and band gap engineering of Fe-doped SrSnO<sub>3</sub> epitaxial films, *EPL*, 108:37003 (2014).
19. **Qin Zhuang Liu**, Yunhua He, Hong Li, Bing Li, Guanyin Gao, Lele Fan, Jianming Dai, Room-temperature ferromagnetism in transparent Mn-doped BaSnO<sub>3</sub> epitaxial films, *Applied Physics Express*, 7:033006 (2014).
20. **Qin Zhuang Liu**, Hong Li, Bing Li, Qiangchun Liu, Guangping Zhu, Kai Dai, Zhongliang Liu, Jianjun Liu, Jianming Dai, Rectifying property and magnetoresistance of manganite-stannate junctions, *Solid State Communications*, 173:30~33 (2013).
21. **Qin Zhuang Liu**, Hong Li, Lele Fan, Epitaxial BiFe<sub>0.95</sub>Mn<sub>0.05</sub>O<sub>3</sub> thin films on transparent La<sub>0.07</sub>Ba<sub>0.93</sub>SnO<sub>3</sub> electrodes, *Journal of Alloys and Compounds*, 581:479~483 (2013).
22. **Qin Zhuang Liu**, Bing Li, Jianjun Liu, Hong Li, Zhongliang Liu, Kai Dai, Guangping Zhu, Peng Zhang, Feng Chen, Jianming Dai, Structure and band gap tuning of transparent (Ba<sub>1-x</sub>Sr<sub>x</sub>)SnO<sub>3</sub> thin films epitaxially grown on MgO substrates, *EPL*, 98:47010 (2012).
23. **Qin Zhuang Liu**, Jianjun Liu, Bing Li, Hong Li, Guangping Zhu, Kai Dai, Zhongliang Liu, Peng Zhang, Jianming Dai, Composition dependent metal-semiconductor transition in transparent and conductive La-doped BaSnO<sub>3</sub> epitaxial films, *Applied Physics Letters*, 101:241901 (2012).
24. **Qin Zhuang Liu**, Jianming Dai, Xiaobo Zhang, Guangping Zhu, Zhongliang Liu Guohua Ding, Perovskite-type transparent and conductive oxide films: Sb- and Nd-doped SrSnO<sub>3</sub>, *Thin Solid Films*, 519:6059~6063 (2011).
25. **Qin Zhuang Liu**, Jianming Dai, Zhongliang Liu, Xiaobo Zhang, Guangping Zhu, Guohua Ding, Electrical and optical properties of Sb-doped BaSnO<sub>3</sub> epitaxial films grown by pulsed laser deposition, *Journal of Physics D-Applied Physics*, 43:455401 (2010).
26. **Qin Zhuang Liu**, Haifeng Wang, Feng Chen, Wenbin Wu, Single-crystalline transparent and conductive oxide films with the perovskite structure: Sb-doped SrSnO<sub>3</sub>, *Journal of Applied Physics*, 103:093709 (2008).

27. 发明专利：**刘亲壮** 李兵,具有钙钛矿结构的未掺杂透明导电氧化物薄膜, 专利号:ZL201510177538.4, 2017 年。

**科研和教学获奖:**

1. 2012 年校“科研先进个人”;
2. 2013 年校首届高校辅导员职业技能大赛三等奖
3. 2014 年校“学术骨干”;
4. 2015 年度本科毕业论文优秀指导教师;
5. 2016 年校优秀教育工作者;
6. 2020 年“相山学者”。