

BaPbO₃ 导电薄膜的制备、结构及性能研究

陆裕东, 王歆, 庄志强

华南理工大学材料学院, 广州 510640

收稿日期 2006-2-17 修回日期 2006-4-4 网络版发布日期 接受日期

摘要 以可溶性无机盐为原料, EDTA、柠檬酸、酒石酸为复合螯合剂, 水为溶剂, 采用改进的溶胶-

凝胶法制备了无裂纹、晶粒尺寸小且均匀分布的钙钛矿结构的BaPbO₃ 导电薄膜. 利用XRD、

SEM和EDS表征方法结合薄膜方阻的测定, 具体分析了Pb/Ba比和晶粒生长情况对BaPbO₃ 薄膜导电性能的影响.

实验结果表明: Pb/Ba比和晶粒生长情况是决定BaPbO₃ 薄膜导电性的两个主要因素, Pb/Ba比的上升和晶粒的长大,

都会提高BaPbO₃ 薄膜的导电性能; 热处理次数对BaPbO₃ 薄膜方阻的影响与薄膜厚度有关. 在700℃下保温

10min的快速热处理方法, 可以获得钙钛矿结构、薄膜方阻为5.86 Ω · □⁻¹ 的BaPbO₃ 薄膜.

关键词 [BaPbO₃](#) [陶瓷](#) [薄膜](#) [sol-gel](#) [薄膜方阻](#)

分类号 [TQ174](#)

Preparation, Microstructure, and Conductive Properties of BaPbO₃ Thin Films

LU Yu-Dong, WANG Xin, ZHUANG Zhi-Qiang

College of Materials Science and Engineering, South China University of Technology, Guangzhou 510640, China

Abstract Crackfree and small grain size perovskite-type ceramic BaPbO₃ conductive thin films were deposited onto

Al₂O₃ substrates by a modified sol-gel method using ethylene diamine tetra-acetic acid (EDTA), citric acid, and tartaric

acid as the complex chelate agent. XRD, SEM, and EDS tests, together with resistivity date,

show a good correlation among the Pb to Ba ratio, grain size, and sheet

resistance. Experimental results demonstrate that BaPbO₃ thin films with

homogeneous composition can be prepared by the method mentioned above.

Sheet resistance of BaPbO₃ thin films decreases with Pb to Ba ratio or grain size increases. The influence of heat

treatment on sheet resistance is related with the thickness of BaPbO₃ thin films. The best electrical properties were

obtained upon a rapid thermal anneal (RTA) at 700℃ for 10 min. Perovskite BaPbO₃ films with sheet resistance of

5.86Ω · □⁻¹ were derived from 20 spin-coating layers and annealed at 700℃ for 10min.

Key words [BaPbO₃](#) [ceramic](#) [thin film](#) [sol-gel](#) [sheet resistance](#)

DOI:

通讯作者 陆裕东 g96217@scut.edu.cn

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