

固体电解质硫化氢气体传感器的特性研究

作者: 钟铁钢, 梁喜双, 刘凤敏, 全宝富*, 卢革宇

单位: 集成光电子国家重点实验室吉林大学实验区 吉林大学电子科学与工程学院

基金项目:

摘要:

采用溶胶-凝胶法制备NASICON(钠离子导体)固体电解质及镍/钛复合氧化物材料。并以NASICON为离子导电层,镍/钛复合氧化物为敏感电极制作固体电解质硫化氢气体传感器。在260-380 °C温度范围内,以镍/钛复合氧化物为敏感电极制作的器件对(1-100)/10⁻⁶硫化氢具有良好的敏感特性。在320 °C时器件的灵敏度(斜率)为-72.4 mV/decade。并且器件具有良好的选择性、抗湿性及响应恢复特性。器件对(5, 50)/10⁻⁶硫化氢的响应恢复时间分别为10.4s和20.40s。最后对器件的敏感机理做了分析。

关键词: 气体传感器; 固体电解质; 硫化氢; 镍/钛复合氧化物

Study on characteristics of NASICON solid-electrolyte H₂S gas sensor

Author's Name: Zhong Tiegang, Liang Xishuang, Liu Fengmin, Quan Baofu *, Lu Geyu

Institution: State Key Laboratory on Integrated Optoelectronics, College of Electronic Science and Engineering, Jilin University

Abstract:

NASICON (sodium super ionic conductor) solid-electrolyte and Ni/Ti compound oxide materials were prepared by sol-gel method. And solid-electrolyte H₂S gas sensor fabricated with NASICON as the ion electric layer and Ni/Ti compound oxide as the sensing electrode. The sensor using Ni/Ti compound oxide as the sensing electrode exhibited well sensing performances to (1-100)/10⁻⁶ H₂S at 260-380 °C. The sensitivity (slope) of the sensor was -72.4 mV/decade at 320 °C. Also the sensor exhibited good selectivity, resistance against water humidity and response-recovery characteristics. The response and recovery time of the sensor to (5, 50)/10⁻⁶ H₂S were 10.4 s and 20.4 s, respectively. At last the sensing mechanism of the sensor was investigated.

Keywords: Gas sensor; Solid-electrolyte; H₂S; Ni/Ti compound oxide

投稿时间: 2010-04-27