电子与信息学报
JOURNAL OF ELECTRONICS & INFORMATION TECHNOLOGY

电子与信息学报 » 2011, Vol. 33 » Issue (11) :2771-2774 DOI: 10.3724/SP.J.1146.2010.01285

SOI微型电场传感器的设计与测试

杨鹏飞*①② 彭春荣① 张海岩①② 刘世国① 夏善红①*

①(中国科学院电子学研究所传感器技术国家重点实验室 北京 100190)
②(中国科学院研究生院 北京 100039)

Design and Testing of a SOI Electric-field Microsensor

Yang Peng-fei①② Peng Chun-rong① Zhang Hai-yan①② Liu Shi-guo① Xia Shan-hong① *

①(State Key Lab of Transducer Technology, Institute of Electronics, Chinese Academy of Sciences, Beijing 100190, China)
②(Graduate University of the Chinese Academy of Sciences, Beijing 100039, China)

摘要 该文研制了一种新型的基于SOI (Silicon-On-Insulator)微机械加工技术的高性能电场传感器敏感结构。为提高传感器的灵敏度和信噪比，该器件采用侧面屏蔽感应电极的独特设计方案，降低了传感器屏蔽电极的边缘效应；并基于有限元仿真，进一步优化了传感器敏感结构参数。在室温和室内大气压条件下，测试表明，测试量程0～50 kV/m，传感器总不确定度优于2%，分辨率为50 V/m。

关键词： 电场微传感器 微机电系统(MEMS) 绝缘体上硅(SOI) 分辨率

Abstract： A novel and high-performance electric field microsensor is presented based on Silicon-On-Insulator (SOI) fabrication technology. In order to improve the sensitivity and SNR (Signal to Noise Ratio) of the sensor, the unique design of the shutter covering the side wall of the sensing electrodes is used, which reduces the effect of fringing fields of the shutter. Moreover, the electrode structure parameters of the sensor are optimized by Finite Element Simulation (FES). It is found that the new sensor had a resolution of 50 V/m at atmospheric pressure, a uncertainty of better than 2% in a electric field range of 0～50 kV/m.

Keywords： Electric field microsensor Micro-Electro-Mechanical Systems (MEMS) Silicon-On-Insulator (SOI) Resolution

Received 2010-11-22;

本文基金:

国家863计划项目(2011AA040405)资助课题

通讯作者: 杨鹏飞 Email: yang330650591@126.com

引用本文:

杨鹏飞, 彭春荣, 张海岩, 刘世国, 夏善红.SOI微型电场传感器的设计与测试[J] 电子与信息学报, 2011,V33(11): 2771-2774

Yang Peng-Fei, Peng Chun-Rong, Zhang Hai-Yan, Liu Shi-Guo, Xia Shan-Hong.Design and Testing of a SOI Electric-field Microsensor[J] , 2011,V33(11): 2771-2774

链接本文:

http://jeit.ie.ac.cn/CN/10.3724/SP.J.1146.2010.01285 **或** http://jeit.ie.ac.cn/CN/Y2011/V33/I11/2771