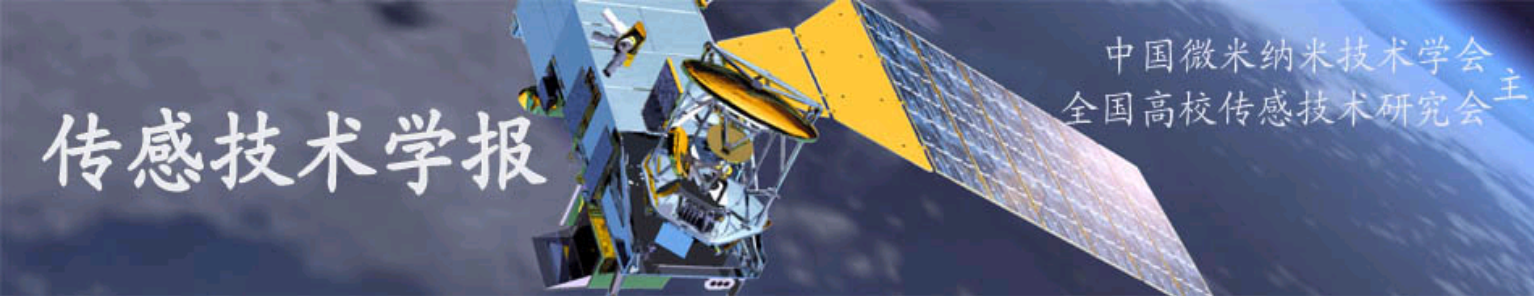

MEMS高g加速度传感器封装热应力的研究

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摘　要：

封装热应力是导致MEMS器件失效的主要原因之一，本文设计了一种MEMS高g加速度传感器，并仿真研究了传感器在封装过程中的热应力及影响其大小的因素根据封装工艺，建立设计的高g加速度传感器封装的有限元模型，利用ANSYS软件仿真传感器在不同的贴片工艺中受到的热应力及影响热应力的因素。结果显在封装中，与直接贴片到管壳底部相比，MEMS高g加速度传感器芯片底面健合高硼硅玻璃后再贴片到管壳底部时，封装热应力可从130Mpa降低到33Mpa；在工艺中，基板的热膨胀系数和贴片胶的弹性模量、热膨胀系数及厚度是影响封装热应力的主要因素；在健合工艺中，基板和健合温度主要影响到热应力的大小

关键词：封装；MEMS高g加速度传感器；热应力；贴片工艺；热膨胀系数.

Study on the Thermal stress of MEMS high-g accelerometer in the Package

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Abstract:

Thermal stress in the package is one of factors that lead to the failure of MEMS device. A MEMS high-g accelerometer was designed , at the same time, thermal stress an factors which effect thermal stress was simulated during the sensor packaging prosess in this paper. According to packaging technology, the finite element model of hig accelerometer package was built by ANSYS software and thermal stress was simulated in the different joining technology. The results show that thermal stress can be reduced from 135Mpa to 33Mpa by comparison with directly patch to the bottom of the shell when it bonded with the glass. In the joining technology, the thermal expan coefficient of the substrate and elastic modulus, thermal expansion coefficient and the thickness of the adhesive are the main factors that would effect the thermal stress; the bonding process, the substrate and the temperature mainly effect the thermal stress .

Keywords: package；MEMS high-g accelerometer；thermal stress；joining technology ；thermal expansion coefficient.

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