

综述评论

## 基于MEMS技术的微型流量传感器的研究进展

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摘要 流量测量是工业生产和科研工作的重要的检测参数. 近年来, 随着对微电子机械系统(MEMS) 的深入研究和取得的进展, 传统的工业和流体力学研究的流量传感器向高集成度, 微型化, 高精度, 高可靠性方向发展, 同时生命科学的发展大大促进了用于微流体, 生物学、医学、卫生、食物等学科研究新型微型流量传感器的研究开发, 微型流量传感器已成为MEMS的重要研究方向. 本文对基于MEMS技术的流量传感器技术的原理、分类作了简要介绍, 归纳和评述了各种基于MEMS技术的流量传感器(热式型, 差压型, 升力型, 流体振动型, 科里奥利型及仿生型微型流量传感器等)的生产工艺和应用特点, 并对基于MEMS技术的微型流量传感器的校正方法做了总结归纳. 介绍了国内在微型流量传感器方面的研制工作. 最后总结归纳出基于MEMS技术的流量传感器发展不同阶段并阐述了各个阶段的发展特点, 并对基于MEMS技术的流量传感器新的发展趋势进行了展望.

关键词 [微型流量传感器](#) [MEMS](#) [最新进展](#)

分类号

## PROGRESSES ON MICROMACHINED FLOW SENSORS BASED ON MEMS TECHNOLOGIES

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### Abstract

Flow measurement concerns an important measuring parameter in industry process and scientific research. Along with the research and rapid development of micro Electro-Mechanical systems (MEMS) in recent years, the trend of development of the flow rate sensor in the traditional industry and fluid mechanics research is high integration level, microminiaturization, high degree of accuracy and high reliability. And, along with research and rapid development of the life sciences, comes the need of new type micromachined flow sensors in microfluid, biology, medicine, health and food scientific research. Micromachined flow sensors have become a major focus of MEMS. This paper briefly reviews the technological development of MEMS, and introduces the principle and classification of micromachined flow sensors based on MEMS technologies. Emphases are put on the detailed summarization and evaluation of the production technology and application characteristics of micromachined flow sensors such as hotwire, heat transfer, differential pressure, lift force, fluid oscillatory, Coriolis and bionic micromachined flow sensors. A summary of calibration method of micromachined flow sensors is given in this paper. And, this paper specially covers the hot hotwire, heat transfer, differential pressure, optics micromachined flow sensors developed in China. In the end, the three stages of development of micromachined flow sensors based on MEMS technologies, the trend of the micromachined flow sensors based on MEMS technologies in future are discussed.

Key words [micromachined flow sensors](#) [MEMS](#) [trend of the micromachined flow sensors](#)

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