

## 电容式微加工超声传感器结构参数对性能的影响分析

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摘要:

介绍了电容式微加工超声传感器(cMUT)的工作原理, 通过理论计算和有限元仿真分析, 讨论了cMUT中薄膜厚度、薄膜半径、薄膜残余应力和空腔厚度的变化对传感器的塌陷电压和谐振频率的影响, 为传感器的设计和制作提供了依据。

关键词: 电容式微加工超声传感器(cMUT), 塌陷电压, 谐振频率

## Influences of the structural parameters on the performance of capacitive micromachined ultrasonic transducer

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**Abstract:**

The operating principles of capacitive micromachined ultrasonic transducer (cMUT) were introduced. The various structural parameters affected the performance of cMUT such as resonant frequency and collapse voltage, the parameters including membrane radius, membrane thickness, residual stress of the membrane and the gap between the two electrodes. This paper reported the analysis results of these effects by the theory formulas deduced from Mason's equation and a 3D finite element modal, the results of these two methods were uniform. The design and fabricate of cMUT could be more feasible according to the work of this paper.

**Keywords:** Capacitive micromachined ultrasonic transducer (cMUT), collapse voltage, resonance frequency

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