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基于间断性腐蚀法的铂热敏传感器的研制

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摘　要：

针对铂湿法刻蚀工艺，提出了间断性腐蚀法，并与边腐蚀边搅拌法和静止法进行了对比，结果显示该方法腐蚀铂曲线光滑、效果好。之后，以普通硅片作为衬底材料，二氧化硅作为隔热层，采用上述微机电(MEMS)工艺加工制作了铂热敏传感器。经热敏性能测试，其电阻温度系数在20℃~80℃时为1571.2ppm/℃；同一批次电阻阻值均匀性为0.35%；非线性度为0.57%；热时间常数为1.1us；在半小时的稳定性测试中其变化幅值为0.005Ω，即精度为0.01%。该热敏传感器制作工艺简单，性能优异，可用于温度敏感、气体传感等热敏传感。

关键词：MEMS；传感器；间断性腐蚀法；电阻温度系数；热时间常数

Research and fabrication of platinum thermal sensor based on intermittent etching method

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Abstract:

For wet etching process of platinum, an intermittent etching method was put forward. Compared with etching along stirring method and static method, it was shown that the etched platinum had smooth curve and perfect effect by using intermittent etching method. Then, selecting silicon wafer as the substrate material and SiO2 as the thermal insulating layer, platinum thermal sensors were fabricated by using the MEMS method mentioned above. Through thermal performance test, it was showed that the thermal sensor had TCR of 1571.2ppm/℃ between 20℃ and 80℃, uniformity of 0.35%, non-linearity of 0.57%, hot-time constant of 1.1us, amplitude change of 0.005Ω in the half-hour stability test, and the accuracy of 0.01%. The thermal sensor has high performance, and its fabrication process is simple. It can be used for temperature sensing, and gas sensing.

Keywords: MEMS; sensor; intermittent etching method; TCR; hot-time constant

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