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Abstract
Combining with the micro-machining and integrated-circuit (IC) technology, porous silicon (PS) is very promising for development of micro-sensors, due to it's high area-to-volume ratio and high resistivity characteristics. In this thesis, we use porous silicon technology to develop magnetic sensors on silicon substrates. The micro-electro-mechanical-system (MEMS) technology was utilized to improve the performance of the sensors in this study.

In this thesis, PS layers were formed by electrochemical anodization method. The high-recombination-rate interface between PS and Si acts as the main magnetic sensing zone. The bulk micro-machining technique was employed to reduce the thickness of the sensing zone in order to improve the sensitivity. Besides, low-doped Si substrates were used to restrict the operation current and to lower the power consumption of the developed sensors.

Based on the experimental results, the sensitivity (S = V B) of the PS magnetic sensor with basic structure is about 5~10V/T (operating at current of 2mA), and is increased to 31V/T for sensors with MEMS structures. Therefore, the PS materials combining the MEMS technology are very potential for development of high-sensitivity magnetic sensors.
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