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MEMS and Ultra-Sensitive Sensors

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Message from the Guest Editor

MEMS sensors have attracted a lot of research. For example, differential pressure sensors have achieved a resolution of 1.3 mPa, while resonant pressure sensors with a 2 MPa measuring range have an accuracy of 0.01%. Small-size MEMS pressure sensors can inspect blood pressure in vessels. The Allan deviation zero bias instability of MEMS accelerometers can be less than 1 micro gravity acceleration. The zero point drift of MEMS gyro can be better than 0.01°/h. Single gold atoms (~3*10-22 g) can be weighted using a carbon nanotube cantilever. The min. magnetic field noise is about 36 pT/Hz(1/2), and a resolution of 5 nT was achieved in the Fe–Co–B-based amorphous ribbon. MEMS resonators have extensive usable frequency ranges from a few Hz to several THz. The interaction between molecules with am fN force level can be detected using MEMS sensors. The detection of single DNAs, proteins, viruses, and cells has been enabled with MEMS bio-/chem-sensors. This SI discusses issues associated with the updated frontier of MEMS sensors, such as theory, material, preparation, measurement, and application.

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Special Issue

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