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Micromechanical Sensing: Environmental Monitoring Possibilities

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ABSTRACT

As microelectromechanical devices or systems (typically known as MEMS) progress from a academic research curiosity to a practical tool, a plethora of application directions have been conceived. One that our group has been studying recently involves utilizing microfabricated beam structures as microresonators for environmental sensing. These microresonators are close in physical operation to such devices as Surface Acoustic Wave (SAW) and the Quartz Crystal Microbalance (QCM), but offer some demonstrated advantages. When used as an environmental sensor, it has been determined that the microfabricated beam resonator has some enhanced sensitivities to detecting mass adsorbed (or absorbed) on the device. Furthermore, the inherent monolithic character, as well as the micron-level size of the device is very appealing for generating arrays of these devices with a high sensor density. In this discussion, an introduction to the technology will be presented along with some recent advances in applying this concept to sensing various physical, chemical and biological species.

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