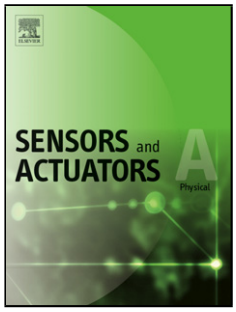

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Multimode Excitation of a Metal Organics Frameworks Coated Microbeam for Smart Gas Sensing and Actuation

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Highlights

- The purpose of this study to demonstrate a smart sensor that is capable of performing simultaneous sensing and actuation using a single device which reduce the device size, power requirement, and cost.
- The concept is based on tracking the frequency shift due to external physical stimuli in the first and third modes of vibration of an electrostatically actuated clamped-clamped microbeam.
- The microbeam is uniformly functionalized with metal organic frameworks (MOFs) to enhance the sensitivity and selectivity of the proposed sensor.
- Optimizing the resonator design to excite higher order modes will open the door for simultaneously measuring multiple physical stimuli using a single resonator, which leads to smarter generation of sensors.

ABSTRACT

Smart sensing systems suffer complexity requiring interface circuits, microcontrollers, switches, and actuators to detect and sense, process the signal and take a decision, and trigger an action upon demand. This increases the device footprint and boosts significantly the power required to actuate the system. Here, we present a hybrid sensor and switch device, which is capable of accurately measuring gas concentration and perform switching when the concentration exceeds specific (safe)