Fiber-Top Cantilevers with Photonic Crystal Cavity Sensors

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Fiber-top cantilevers open a new modality of Atomic Force Microscopy. Their reduced size and enhanced optical sensitivity allow for very sensitive force measurements. The small diameter of the device (125um) can also allow for smaller AFM systems or the bundling of several probes in 2D for parallelization. Functionalized fiber-top cantilevers have also been used in chemical and biological sensing. We propose a design for a fiber-top cantilever that can be fabricated with traditional CMOS and MEMS techniques, thereby making them amenable to commercialization. The proposed design uses photonic crystals for monolithic fabrication where the device’s optical cavity doubles as its release structure. This process is designed for a standard SOI wafer and has been simulated. Actual devices are currently being made.