Fabrication of resonant micro cantilevers with integrated transparent fluidic channel

Microfabricated cantilevers are proving their potential as excellent tools for analysis applications. In this paper, we describe the design, fabrication and testing of resonant micro cantilevers with integrated transparent fluidic channels. The cantilevers have been devised to measure the density of fluids or detect particles suspended in a fluid by sensing the change in total mass of the structure. The 4 × 4 μm2 integrated microfluidic channel makes it possible to flow a fluid through the channel while the cantilevers are resonating. The movement of any particles (present in the fluid) can be visually observed through the transparent fluidic channel. The resonant frequency of the cantilever is changed by the fluid inside the channel, due to the change in mass. The shift in the resonant frequency can be translated into a density of the fluid or into the presence of macro/micro molecules. Such cantilevers can be used as density sensors, to monitor growth of biological cells, measure mass of particles, etc.