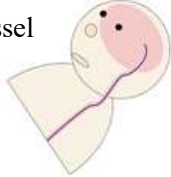


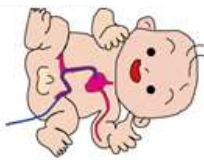
Ultra-miniature fiber-optic pressure sensor using white light interferometry

Blood pressure is one of the most important information indicating the condition of the human body among biological information, and abnormalities of heart and vascular system will be reflected sensitively. We have developed an ultra-miniature fiber-optic pressure sensor of 125 μm in diameter by micromachining technology and optical technology. We aim to measure the local blood pressure in intravascular stenosis, microvasculature, children and small animals in catheter treatment (Fig 1). The sensing element, which is composed of a thin diaphragm, is fabricated by micromachining technology on the fiber end, and the diaphragm deformation caused by pressure can be detected by using white light interferometry (Fig2,3). This sensor has various advantages, for example, it can be used in such electromagnetically harsh environments, and it can be produced at a relatively low cost because a lot of sensor chips can be batch fabricated by semiconductor microfabrication technology. The blood pressure of a goat was able to measure by using this sensor (Fig.4).

Brain microvessel



Child



Small animals



Intravascular stenosis

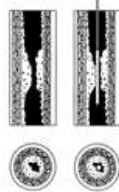


Fig.1 Applications of fiber-optic blood pressure sensor

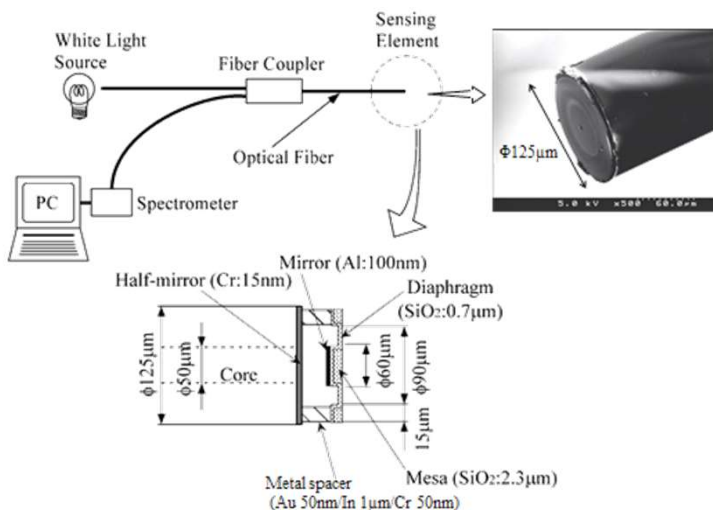


Fig.2 Schematic of sensor system

Contact information:
Yoichi Haga
haga@tohoku.ac.jp

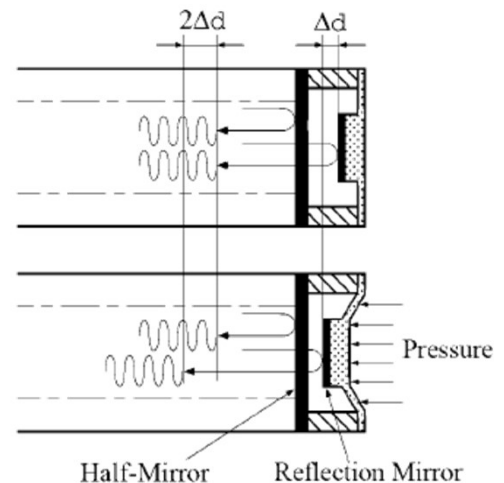


Fig.3 Detection principle of pressure

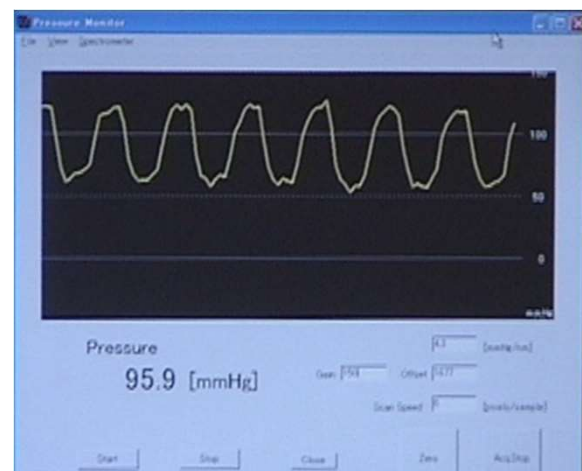


Fig.4 Continuous display of blood pressure

<Reference>

K.Totsu, Y.Haga and M.Esashi, "Ultra-miniature fiber-optic pressure sensor using white light interferometry," Journal of Micromechanics and Microengineering, Vol.15, No.1 (2005), pp.71-75