

## Colloidal Crystal Embedded PDMS Thin Film for Real-Time Pressure Monitoring in Microfluidic Devices

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Colloidal crystal is a promising material in the field of sensors as its optical properties can be easily changed by the incident angle of light, the refractive index, the size of particles, the distance between particles, and so on. In this study, we fabricate a colloidal crystal embedded PDMS thin film on a microfluidic channel and use it as a pressure sensor. This sensor can be deformed by the pressure inside the microchannel, and the reflection characteristic changes with the incident angle changed by the deformation. The relationship between the deformation and the reflectance of the thin film under pressure can be predicted by the FEM method reveal that our material's optical properties can be changed upon very small deformation of film which can be potentially useful for real-time monitoring of pressure in microfluidic devices. Based on this simulation, we make the sensor unit upon microfluidic channel and optically observe pressure change in the channel in real-time.