

## A natural rubber diaphragm based transducer for simultaneous pressure and temperature measurement by using a single FBG

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### ABSTRACT

A natural rubber diaphragm bonded with a single FBG is demonstrated to measure the pressure and temperature simultaneously. Half of the grating is bonded to the rubber diaphragm while the other half is bonded to the aluminium sheet. Under varying pressure at constant temperature, the sensitivity is recorded at 0.1007 nm/kPa with coefficient of  $6.49 \times 10^{-5}$  kPa<sup>-1</sup>. The temperature sensitivities at constant pressure is recorded at 0.0797 nm/°C and 0.0326 nm/°C, respectively. The experimentally obtained different sensitivities of the sensor in matrix equation approach capable to interpret the Bragg wavelength shifts into pressure and temperature information simultaneously.

### Keywords:

Fibre Bragg grating (FBG); Optical fibre sensor; Simultaneous pressure and temperature measurement