

A highly sensitive multiplexed FBG pressure transducer based on natural rubber diaphragm and ultrathin aluminium sheet

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ABSTRACT

Pressure measurement with a good sensitivity has always been a concern in most of the engineering applications and biomedical field. In this paper, a multiplexed FBG bonded on an ultrathin aluminium sheet which act as a cantilever deflected due to a deformation from a natural rubber based diaphragm has been proposed and studied. By using two gratings inscribed on a single optical fibre which senses the positive and negative strain has enhanced the sensitivity of the pressure transducer recorded at 329.56 pm/kPa or corresponding to 10.7893 kPa₋₁ across the range of 0 to 10 kPa with a good linearity of 99.76%. Furthermore, the thermal cross-sensitivity is compensated.

Keywords:

Fibre Bragg Grating (FBG); Pressure sensor; Temperature compensation