

DEVELOPMENT OF FIBRE BRAGG GRATING (FBG) BASED PRESSURE TRANSDUCER WITH TEMPERATURE COMPENSATION

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ABSTRACT

In this work, an aluminium diaphragm fibre Bragg grating (FBG) pressure transducer with temperature compensation is presented. FBG based sensors are good for some applications such as pressure vessel, biomedical and combustion chamber. One of the greatest challenges for an FBG based transducer is the inconsistency in output wavelength due to temperature variations. This leads to huge variation in pressure readings. In this study, two FBG are bonded on the diaphragm and base surface of the pressure transducer, respectively. The inconsistency of wavelength was eliminated by applying the temperature compensation technique. The result shows that this FBG pressure transducer has a sensitivity of 2.849 nm/MPa and a linear fitting coefficient of 99.97% in a pressure range from 0 to 0.2 MPa. This FBG pressure transducer is proven to be suitable for pressure measurement of gas or liquid with an average error of 1.97%.

Keywords: Fibre Bragg grating (FBG); Pressure sensor; Temperature compensation.