UV written waveguide devices – Bragg gratings and Applications in Sensors


¹Optoelectronics Research Centre, University of Southampton, Highfield, Southampton, SO51 7WB, United Kingdom

*corresponding author pgrs@orc.soton.ac.uk

Abstract

UV direct writing (figure 1) provides a powerful route for the fabrication of integrated optical devices. It has significant benefits in terms of simplicity, flexibility and cost which make it attractive for applying integrated optical concepts to other areas of science and technology. Within our group, we have developed a novel approach for creating Bragg gratings in a planar format (figure 2), with great flexibility in terms of centre wavelength, bandwidth and position within chip[1].

These planar Bragg grating devices are ideally suited for use in sensors[2] in etched window is created that allows access of the evanescent field of the optical mode to a liquid measurand. The effective index of the mode is altered by the presence of the liquid, and this, in turn, alters the Bragg wavelength of the grating. By measuring the Bragg grating wavelength shift we can resolve refractive index changes of as small 1 part in 10⁶.

In this talk, we will present results on sensors for applications in chemical, phase change and biological sensing. Further recent results will show how this sensor configuration may be used with nematic liquid crystals to achieve tunable grating operation with tuning exceeding 100GHz.

Planar waveguide hygrometer and state sensor demonstrating supercooled water recognition

Author(s): Sparrow IJG, Emmerson GD, Gawith CBE, Smith PGR
Source: SENSORS AND ACTUATORS B-CHEMICAL 107 (2): 856-860 JUN 29 2005

References