

A pH Sensor Based on Corrugated Long-Period Fiber Grating

Chia-Chin Chiang, Cheung-Hwa Hsu^{1,*} and Chao-Hui Ou¹

Department of Mechanical Engineering, National Kaohsiung University of Applied Sciences,
415 Chien Kung Road, Kaohsiung 807, Taiwan

¹Department of Mold and Die Engineering, National Kaohsiung University of Applied Science,
415 Chien Kung Road, Kaohsiung 807, Taiwan

(Received November 5, 2012; accepted February 4, 2013)

Key words: corrugated long-period fiber grating, optical fiber sensor, pH

In the present study, we propose a pH sensor based on a corrugated long-period fiber grating (CLPFG). CLPFG is highly sensitive to refractive index changes, and, with an appropriate sensitive coating, can detect a variety of chemical parameters. CLPFG is designed to act as a spectral loss device that couples with a discrete wavelength out of the optical fiber as a function of the surrounding refractive index. By applying a special coating that changes the refractive index through the absorption of target molecules to the CLPFG surface, the CLPFG can become a transducer for chemical measurement. In this paper, the incorporation of a polyvinyl alcohol and polycyclic acid (PVA-PAA) coating onto CLPFG to produce an optical-fiber-based pH sensor with a pH detection range from 2 to 6 is discussed.

*Corresponding author: e-mail: chhsu@kuas.edu.tw