

Abstract

In the project, we use LabVIEW to build up a platform of optical fiber sensor based on SPR for sensor design and SPR signal detection. The platform can not only simulate the curve of SPR by input nine parameters of the device but also read the optical spectrum data of the SPR sensor experimentally and calculate the SPR curve. It also provides the function to combine both of the simulation and the experimental result together for compare. For carrying out the project, first we use the platform to simulate all the parameters of SPR sensor, and study the influence of parameters on the SPR wavelength and transmission and find out the optimum parameters (grinding thickness, grinding width, metal thin film thickness, etc). According to the optimum parameters, we make use of the optical fiber side grinding technology and sputtering coating technology to fabricate the optical fiber SPR sensor. In measurement, we use the platform to read the signals of optical spectrum. As a result, we find that the simulation curve approaches to the measurement data. In additions, we experimentally measure the bending effect on the transmission of plastic optical fiber SPR sensor and calculate the sensitivity and the resolution of the device. The result shows that the bending effect could improve transmission and further provide SPR wavelength selectivity for the design of SPR sensor.