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Abstract
Owing to the optic fiber、integrated optics and optical semiconductor development so quickly these years, they lead to optics fiber sensor has been extensively applied in several industry. Besides, there are many research results to be related to magnetic field are now in widespread use in industry and medical science. Therefore, to measure magnetic field is an important issue nowadays.
We will focus on the structure of Mach-Zehnder interferometer of fiber magnetometer in this paper, and make use of high permeability magnetostrictive material as sensor component of magnetic field. This research is use mantle structure on sensing fiber, we bind some magnetostrictive material on sensing fiber, if we add extra magnetic field effect on sensing fiber, the magnetostrictive effect will cause sensing fiber produce deformation effect and phase changes. The magnetostrictive effect has many advantage of sensor. First, it is a simple and functional way to make a sensor. Second, it has high sensitivity. So, magnetostrictive effect is the main way to fabricate a fiber optics magnetometer. Magnetostrictive materials are classified two parts, one part is metal glass the other one part is crystal metal. Metal magnetostrictive materials are Ni, Co, Fe, and these three element metal chemical compounds. We take dissimilar magnetostrictive materials to text, also create WCS-NG1 and WCS-FS-1 polymer as the sensing component then comparison each experiment result: frequency response, interference signal and sensitivity of this system.
The structure of Mach-Zehnder interferometer of fiber optics magnetometer has plenty merit: volume small, high sensitivity and can work at high temperature.
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