Light Science & Applications

Optical Fiber-Based Technologies & Applications

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Abstract

Optical fiber-based devices have been widely deployed in recent years. There are many advantages of using fiber as a sensor. These include electrically-passive operation, light weight, immunity to radio frequency interference and electromagnetic interference, high sensitivity, compact size, corrosion resistance, easily multiplexing and potentially low cost.

Several novel fiber-based sensors and technologies developed are presented here, including fiber Bragg grating (FBG) based sensors, photonic crystal fiber (PCF) based sensors, specialty fiber-based sensors and distributed fiber sensing systems. FBGs as instinctive sensors, are ingeniously designed as two-dimensional (2D) tilt sensors, displacement sensors, accelerometers and corrosion sensors here; PCF based evanescent field absorption sensor, PCF induced Mach-Zehnder interferometer and Fabry-Perot refractometer for temperature and refractive index sensing are presented; based on localized surface Plasmon resonant (LSPR) effect, nano-sized fiber tip with gold nanoparticles are demonstrated for live cell index bio-sensing applications.

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Professor Shum, chair professor of the Department of Electrical and Electronics Engineering, Southern University of Science and Technology, Director of Guangdong Key Laboratory of Integrated Optoelectronics Intellisense，national distinguished expert, IEEE Fellow, SPIE Fellow, OSA Fellow, President of IEEE Photonics Society. He has published 500 academic journal papers with more than 20,000 citations, and H-index 70. He served as Director of the Network Technology Research Centre (NTRC), Photonics Centre of Excellence (OPTIMUS), and Centre for Optical Fibre Technology (COFT), and Associate Chair in charge of academic programs in Nanyang Technological University, Singapore. During this period, a world-class fiber research/processing center was created, which enabling Singapore to have the ability

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