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Fabrication of miniaturized capillary waveguide integrated fiber-optic sensor for fluoride determination in water

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Fluoride concentration is a key aspect of water quality and has an essential role in human organisms. Too much or too little fluoride intake from water supplies is harmful to public health. In this work, a capillary waveguide integrated fiber-optic sensor was fabricated for *in situ* measurement of fluoride in water samples. The sensor was modularly designed with three parts, including light source, capillary flow cell and detector. When light propagated from a Light Emitting Diode (LED) to the capillary waveguide cell through an excitation fiber, it interacted with sensing reagents and its intensity changed with different fluoride concentrations. Then the light propagated to the detector through a detection fiber for absorption determination of fluoride according to Beer's law. By using easily accessible capillary tube, silica fiber and cheap LED, the sensor was successfully miniaturized and fabricated with low cost for *in situ* measurement of fluoride. This miniaturized sensor showed advantages of fast analysis (9.2 s), small reagents demand (200 μL), lower detection limit (8 ppb) and high selectivity. Fluoride in different water samples were determinated using this sensor. The results obtained were compared with those obtained by conventional spectrophotometry, showing agreement and validating the sensor's potential applications.

Biography

Yan Xiong has completed her PhD from Dalian Institute of Chemical Physics, Chinese Academy of Sciences. She got the DICP-Corning Award, won a first prize from the China Association for Instrumental Analysis, and received the honor of Liaoning Provincial Excellent Graduate. She has published more than 20 papers in reputed journals .

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