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# Surface plasmon resonance sensing with adjustable sensitivity based on a flexible liquid core coupling unit

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## Abstract

The signal amplification methods of surface plasmon resonance (SPR) are mainly with sample selectivity. Herein proposed is a liquid core coupling SPR sensing method with adjustable sensitivity and universal applicability. A liquid core coupling unit and based on which a wavelength interrogation SPR sensor have been designed and constructed, in which a conventional chip could be used with an ingenious design and the sensitivity can be adjusted by changing the liquid core refractive index. The experimental data revealed that the sensitivity can be enhanced for 7.8 times by decreasing the liquid core refractive index from 1.5174 to 1.4502. The real applicability was validated by determination of carcinoembryonic antigen (CEA) with the signal intensity of the early stage colon cancer patient clearly up-regulated for nearly 18 folds compared with the healthy. It exhibited an adequate sensitivity, and further considering its simplicity avoiding the troublesome analysis process and/or chip preparing procedure, and extendibility to SPR imaging, the proposed method would be promising for medical diagnostics, food safety, environmental monitoring, and so on.

Graphical abstract

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