عنوان مقاله:

Chemical sensing and biosensing by microfluidic based porous silicon nanosensor via reflectometric interference spectroscopy

محل انتشار:

سومین همایش بین المللی تحقیقات در علوم و فناوری نانو (سال: 1402)

تعداد صفحات اصل مقاله: 9

نویسندگان:

Fatemeh Aliabadi - *Division of Nanobiotechnoloy, Department of Life Science Engineering, Faculty of New Sciences andTechnologies, University of Tehran, Tehran, Iran*

Fereshteh Rahimi - *Division of Nanobiotechnoloy, Department of Life Science Engineering, Faculty of New Sciences andTechnologies, University of Tehran, Tehran, Iran*

Ali Abouei Mehrizi - *Biomedical Engineering Division, Department of Life Science Engineering, Faculty of New Sciences andTechnology, University of Tehran, Tehran, Iran*

Maryam Nikkhah - *Department of Nanobiotechnology, Faculty of Biological Sciences, Tarbiat Modares University, Tehran, Iran*

خلاصه مقاله:

Reflectometric interference spectroscopy and single-layer porous silicon can be used as a powerful nanosensor to detect a variety of biological and non-biological molecules. Incorporation this nanosensor with a microfluidic system can amplify the properties of this nanosensor, including improving sensitivity and specificity and response time. In this research, single-layer porous silicon was fabricated using electrochemical corrosion method. Microfluidic chips were fabricated using soft lithography and poly(dimethylsiloxane) (PDMS) polymer. Porous silicon was placed inside a PDMS chip. The surface of the chip containing the channel and the chip containing the porous silicon were activated by plasma oxygen in order for the two chips to adhere to each other, and then they were placed at ۹۰ ° C for final baking. Methanol, ethanol and isopropanol alcohols with different refractive indexes were injected into the microfluidic chip by syringe pump, respectively. The results showed that our nanosensor is able to detect and differentiate between these alcohols with different refractive indexes. Through functionalization of porous silicone surface by a specific aptamer of recombinant human erythropoietin alpha (rHuEPO-α), this nanobiosensor can be used for detection of rHuEPO-α.

کلمات کلیدی:

Porous silicon, microfluidic, reflectometric interference spectroscopy, soft lithography and PDMS polymer.

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