

Low-cost, high-sensitivity, fast and easy detection of liquids or gases by a nanophotonic sensor and a smartphone

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Abstract

We present a new way of easy, optical detection using a nanophotonic sensor. The sensor uses plasmons in nanowires [1] that can be affected by the surrounding environment, especially liquids, but also gases or some solids. The sensor can be coupled to a smartphone for an easy detection of the properties of the substance. Applications can be from detection of the quality of food (virgin or mixed olive oil, wine or beers, quality of pure or mixed alcohols, etc.) to identification of specific labeling and security. The nanophotonic sensor only needs a very small volume for detection of 0.0025 mL and can detect a mass as small as 0,1 mg or a volume as small as 8×10^{-5} mL. The detection can be as fast as 1 second. The sensor is low-cost produced and can be easily replaced or just disregarded for the identification of biological or biohazard substances or other dangerous specimens.

References

- [1] E. Baquedano, M. U. González, R. Paniagua-Domínguez, J. A. Sánchez-Gil, and P. A. Postigo, "Low-cost and large-size nanoplasmonic sensor based on Fano resonances with fast response and high sensitivity," *Opt. Express* 25, 15967-15976 (2017)

Figures

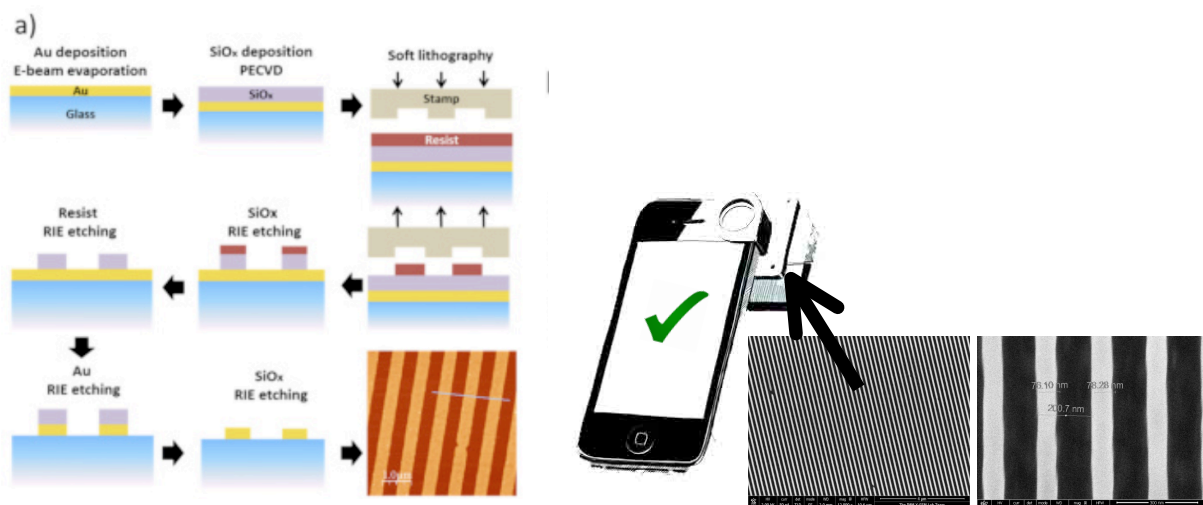


Figure 1: (a) Fabrication process for the nanophotonic sensor, based on low-cost soft-lithography. Thousands of sensors can be fabricated on a single step. Detection can be performed by a smartphone.