



Aluminum Microchips for Biosensing and Pathogen Identification

Tech ID: 32517 / UC Case 2021-827-0

BACKGROUND

Label-free technologies such as surface plasmon resonance (SPR) spectroscopy form a core component of bioanalytical and biopharmaceutical research. SPR also plays a key role in DNA sensors and for disease diagnosis. Plasmonic film used in manufacturing sensor substrates for these analyses has been limited to gold. While there are other materials with excellent plasmonic properties, little work with demonstrated practical prototypes exists that take advantage of this potential.

BRIEF DESCRIPTION

Prof. Quan Cheng and colleagues from the University of California, Riverside have developed aluminum (Al) microchips for highly sensitive SPR detection of bioanalytical targets. This technology allows for determination of binding kinetics of drug targets and disease marker detection. In addition to applications for SPR, these Al microchips enable other surface-based techniques such as enhanced Raman spectroscopy and MALDI-MS for direct pathogen identification.

Compared to traditional gold substrates, Al has a broad range of advantages. It is more plasmonically active, leading to high optical sensitivity, and it is chemically flexible for design of various analytical platforms. Al also has several manufacturing benefits that make it commercially appealing when compared to gold, such as higher abundance, lower cost, and simple integration into existing manufacturing processes such as CMOS.

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OTHER INFORMATION

KEYWORDS

microchip, aluminum, surface plasmon resonance, SPR, MALDI-MS, laser desorption ionization mass spectrometry, LDI-MS

CATEGORIZED AS

- ▶ [Biotechnology](#)
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RELATED CASES

2021-827-0, 2010-561-0, 2021-821-0

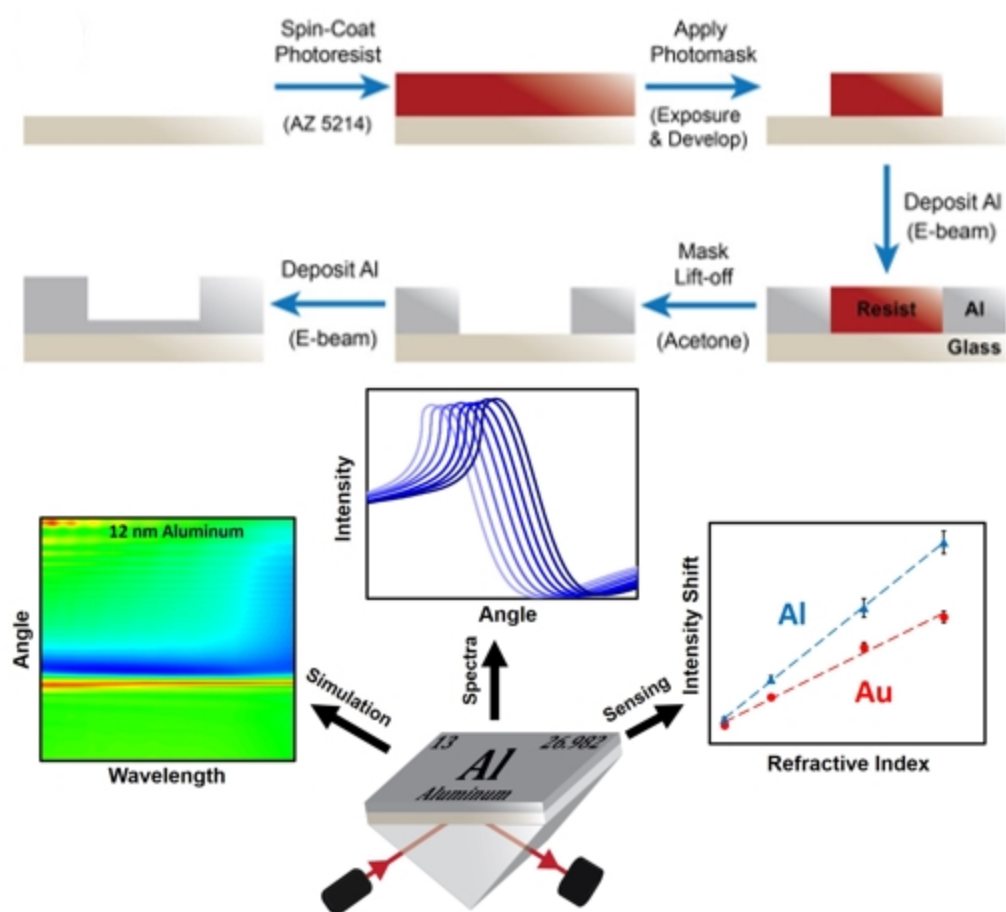


Fig 1: (Top) Fabrication of aluminum microchips. (Bottom) Aluminum demonstrates a high theoretical and practical plasmonic activity correlating to a higher detection sensitivity for biological targets.

APPLICATIONS

- ▶ For use as a microchip for biopharmaceutical study of molecular interactions compatible with industry standard instrumentation
- ▶ For use as a microchip in biosensing techniques for food safety and disease diagnosis

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	2022039753	12/15/2022	2021-827

RELATED MATERIALS

- ▶ [Anal. Chem. 2020, 92, 13, 8654–8659](https://doi.org/10.1021/acs.analchem.0c01631) Publication Date: June 11, 2020 <https://doi.org/10.1021/acs.analchem.0c01631> - 06/11/2020

RELATED TECHNOLOGIES

- ▶ [Plasmonic Gold Microchips for Swift Microbial Identification with MALDI-MS](#)

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