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Fabrication of plasmonic thin film via DC sputtering with optics based assessment for trasmittance, absorbance and resonance (Article)

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Abstract

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A plasmonic thin film is potentially to be used with the advancement in optical biosensor. It is a label free without a need of fluorescent, chemiluminescent, radioisotope and etc. It is crucial to design a low cost biosensor that is easily fabricated at precise sizes and density. This paper reported a fabrication for copper and gold thin film on a glass substrate with a magnetron sputtering. The objectives are to: 1-Fabricate the thin film, 2- Develop the optics setup, 3- Evaluate the thin films and 4-Exhibit the optical resonance. Seven glass slides were coated with six copper and remaining with gold at different sputtering time. The time was varied from 280 sec to 980 sec while Argon gas and DC power were maintained respectively at 80 sccm and 130 watt. Later, the optics based was employed for assessing the film thicknesses. The thin films fabrication indicates different thicknesses were achieved at various sputtering time. Given y is a thicknesses and x is a sputtering time, respectively the copper and gold thin film were changed quantitatively at y= 28.335e0.0005x and y= 0.25x. Qualitatively, spectral transmittance and absorbance were changed to the thicknesses of the thin films. The plasmonic resonance was achieved with gold thin film at 50 nm thicknesses. The resonance sensitivity was decreases as the thin films thicknesses were increases.

SciVal Topic Prominence

Topic: Metallic Glasses | Zirconium | Potentiodynamic Polarization

Prominence percentile: 85.792

Author keywords

DC sputtering | Optical resonance | Plasmonic | Spectral absorbance | Spectral transmittance | Thin film

Indexed keywords

Engineering controlled terms: Biosensors | Fabrication | Glass | Gold coatings | Optical films | Plasmonics | Quantum optics | Resonance | Sputtering | Substrates

Engineering uncontrolled terms: Glass substrates | Gold thin films | Low-cost biosensors | Optical bio-sensors | Optical resonance | Plasmonic resonances | Spectral transmittance | Sputtering time

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