

OPTIMIZATION AND CHARACTERIZATION OF AMORPHOUS/NANOCRYSTALLINE BIOSENSORS FOR DNA DETECTION USING GOLD NANOPARTICLES

L. B. Silva¹, P. Baptista², H. Águas¹, G. Doria², R. Martins¹ and E. Fortunato¹

¹CENIMAT/I3N, Materials Science Department, Campus de Caparica, 2829-516 Caparica, Portugal

²CIGMH/SABT, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa, 2829-516 Caparica, Portugal

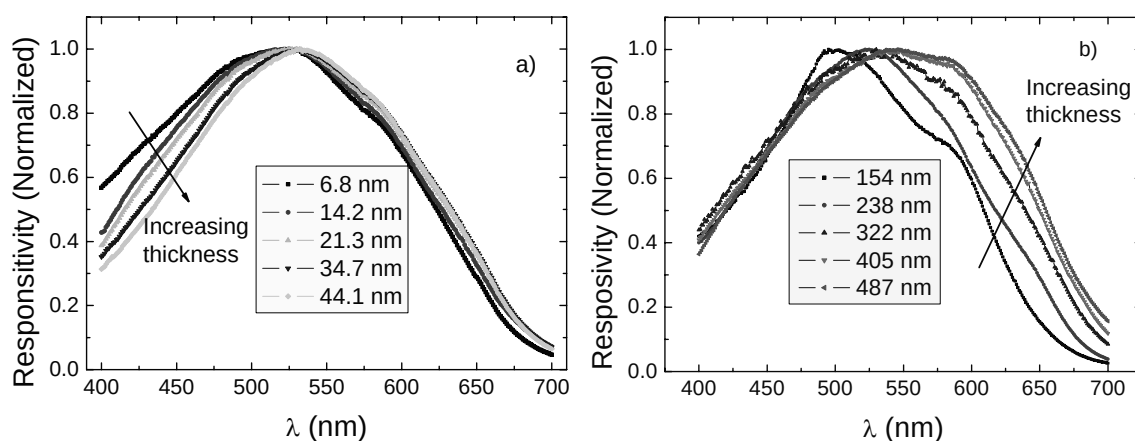
Tel: +351212948562; Fax: +351212948558

lbds@fct.unl.pt

Nanotechnology is having a positive impact on nearly every industry, and in particular in healthcare, where it is extending the limits of molecular diagnostics to the nanoscale – Nanodiagnostics. Here we describe an innovative optoelectronic platform for the colorimetric detection of nucleic acids based on oligonucleotide-derivatized gold nanoparticles. The device integrates an amorphous/nanocrystalline biosensor and a light emission source with a gold nanoprobe for specific DNA detection.

The sensor (optical and electrical properties) showed an optimized spectral response at around 527 nm, also the maximum absorbance for the gold-nanoprobes, and SNR in the order of 130 dB for a green (532nm) light source of 5mW. The described system presents several advantages: i) no need to functionalize the glass surface with probe DNA; ii) the sample is directly applied on the back side of the biosensor ensuring maximum photon capture and the possibility of re-use; iii) requires small amount of biological sample.

The described system combines two technologies - gold nanoparticle based DNA detection and optical sensors based on thin film technology - leading to significant cost and time savings in DNA/RNA assays, allowing for molecular diagnostics at point-of-care without compromising specificity and sensitivity.



Influence of the thickness on the responsivity of the sensor for the a) p-layer and b) i-layer.

References

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