

Thesis Defense of Fabien CASSIO on next 16 december.
You can communicate this information to colleagues, who may be interested.

Thesis Defense
Institut Foton – SP team
Thursday 16th december 2021, 10:00 am (room 020G)

Hybrid photonic integrated circuits based on porous silicon and polymers for biosensor applications

Fabien CASSIO

Jury :

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Abstract

Biosensors are devices used to detect the presence of biomolecules in a sensing field, which can be a liquid or a gas. The use of integrated optics allows to exploit various interactions of biomolecules with propagated light in compact and easily realizable guiding structures, such as micro-resonators. In this thesis, we use porous silicon in the fabrication of our optical transducers for biosensors. It is a biocompatible material with a large specific surface on which molecules can be grafted. It also allows to exploit the surface detection of biomolecules directly in the volume of the material because of its porous nature. The material must first get a biofunctionalization process to allow the infiltration of molecules in the pores that compose it. Using a photolithography process, micro-resonators are fabricated to be used as transducers for the surface detection of BSA. The presence of the protein in the detection field will induce a quantifiable change in the properties of the transducers related to the concentration of BSA. A sensitivity of more than 1000 nm/RIU could be obtained and is better than the state of the art. The realization of a hybrid structure based on porous silicon and polymers is studied. The advantage of the coupled use of porous silicon and polymers is to allow the reduction of propagation losses while improving the performances of this type of biosensor.