

CALL: Convocatoria del programa posdoctoral de perfeccionamiento de personal investigador doctor 2016: nuevas ayudas y renovaciones.

(https://www.euskadi.eus/ayuda_subvencion/2016/posdoc-berri/y22-izapide/es/)

TITLE: *PHOTO-CONTROLLED MOLECULAR CRANES IN MICROFLUIDIC PAPER-BASED ANALYTICAL DEVICES (μ PADS) FOR RAPID POINT OF NEED ENVIRONMENTAL SENSING.*

PROJECT DESCRIPTION:

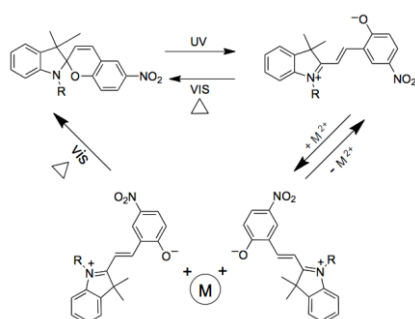


Figure 1: Metal ion binding propriety of spiropyran derivatives.

The real-time analysis of metal ions is important for chemical monitoring as well as environmental and clinical applications. A relatively new and promising approach in the area of sensing involves the integration of polymeric optical-sensing materials and fluidic functionalities at the micro-scale to leverage their combined advantages [1]. In this project the microfluidic part will be represented by μ PADS, which possess many advantages including reduced consumption of reagents and analytes, improved time efficiency in the analysis, shrinkage in the size and weight of the systems, increased portability, and low cost in fabrication.

The microfluidic devices will be functionalised with polymeric brushes based on spiropyran [2]. Upon irradiation with UV light the passive spiropyran (SP) unit undergoes a heterocyclic ring cleavage that results in the merocyanine (MC) formation (Figure 1). In contrast to the uncharged and colourless spiropyran form, the MC is highly charged and can be used as ligand for other charged species. B could be successfully used for the accumulation, optical detection and release of different metal ions (Zn^{2+} , Co^{2+} , Cu^{2+} , Ni^{2+} , Cd^{2+}) in continuous flow.

The microfluidic device will enable compact and rapid processing of small samples at the point of need, while the SP-polymeric coating will enable real-time detection of metal ions, photo-accumulation followed by photo-release. The use of light to trigger the chelator offers unique opportunities that minimise waste generation and power requirements.

MULTIDISCIPLINAR PROJECT:

- **YEAR 1-2:** Prof. Dermot diamond (DCU): Insight Centre for Data Analytics, Dublin City University, Dublin, Ireland. (<https://www.insight-centre.org/users/dermot-diamond>)
- **YEAR 3:** Dr. Fernando Benito-Lopez (UPV/EHU): Analytical Microdevices & Materials for Lab-on-a-Chip Group; Microfluidics UPV/EHU Cluster. Analytical Chemistry Department, Vitoria-Gasteiz, Spain. (<http://www.ehu.es/en/web/Microfluidics/home>)

REQUIRED QUALIFICATIONS AND EXPERIENCE:

Candidates must hold a PhD on a topic related to Material Science (Chemistry, Biotechnology). Experience on microfluidics, optical sensors and electronic systems will be desired. High English language level is a must.

To apply please send an letter of interest, your CV and contact details to Fernando Benito-Lopez: fernando.benito@ehu.es

[1] L. Florea, A. Hennart, D. Diamond, F. Benito-Lopez, *Sens. Actuators B.*, 2012,175, 92-99.

[2] F. Benito-Lopez, S. Scarmagnani, Z. Walsh, B. Paull, M. Macka, D. Diamond, *Sens. Actuators B.*, 2009, 140, 295–303.