European Network on New Sensing Technologies for Air Pollution Control and Environmental Sustainability - *EuNetAir*

COST Action TD1105

1ST TRAINING SCHOOL

Universitat de Barcelona, Spain, 13 - 15 June 2013

organized by UB, MIND-IN2UB - Dept. of Electronics and CSIC-IDAEA

Action Start date: 01/07/2012 - Action End date: 30/06/2016

Year 1: 2012 - 2013 (*Ongoing Action*)

Trainee Affiliation Logo

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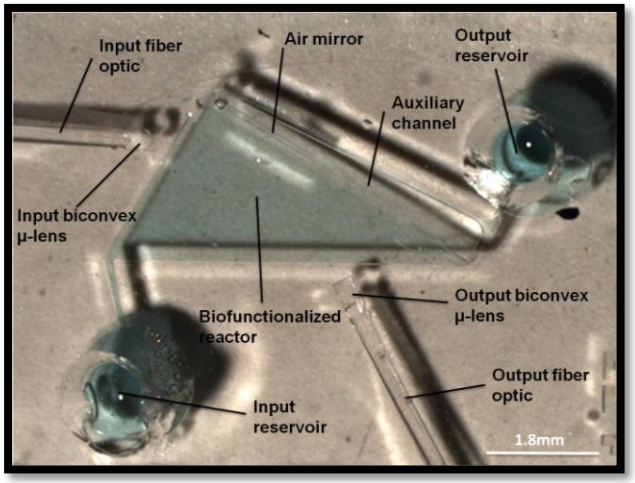
COST is supported by the EU Framework Programme

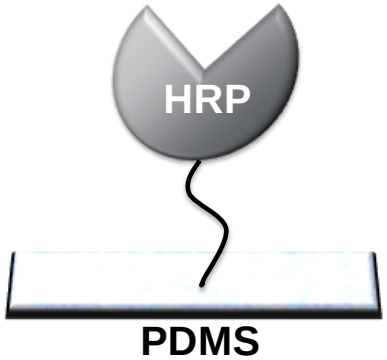
ESF provides the COST Office through a European Commission contract

Expertise of the Trainee related to the Action

- Microfluidic lab on a chip for analyte detection

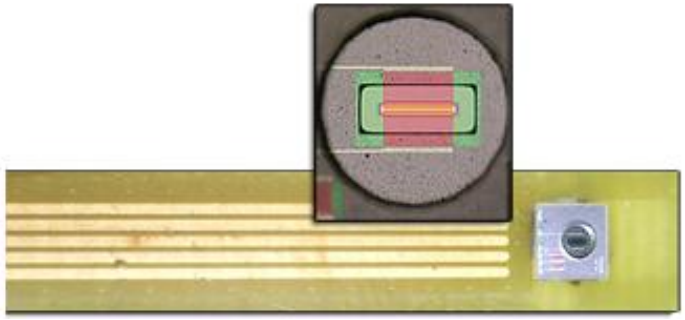


- Surface functionalization for the development of sensing surfaces

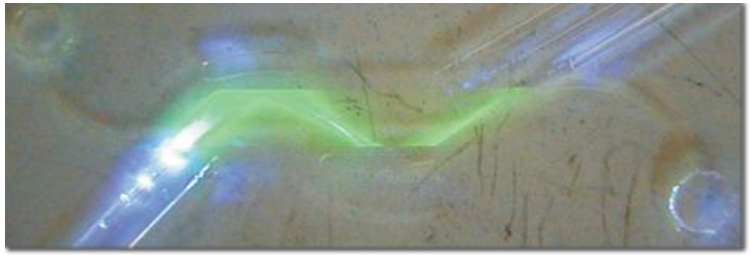


Current research activities of the Trainee

- **Current research topics at the Trainee organization / Problem statement:**



Electrochemical detection sensors



Optical detection sensors

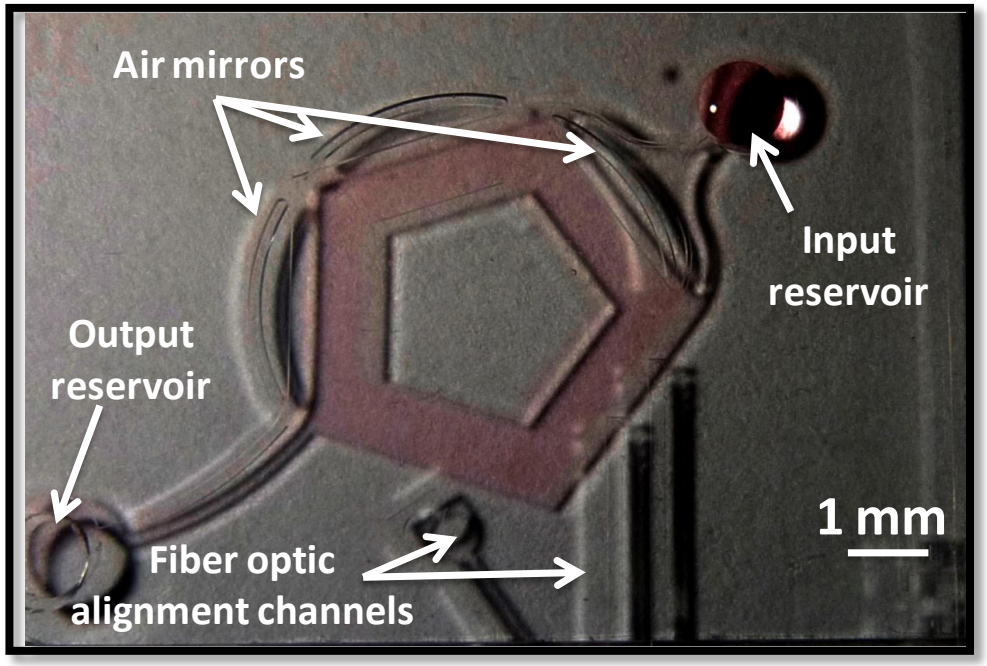
Large variety of applications: environment, food, biomedical…

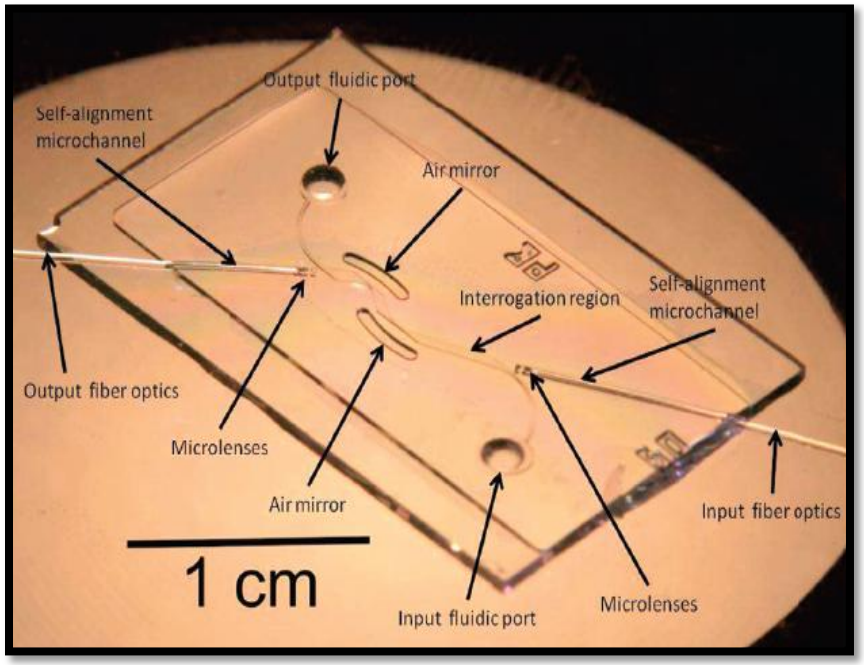
- **Brief list of ongoing research topics of the Trainee:**
  - Functionalized lab on a chip systems with dual optical and electrochemical) detection mode

Achieved RESULTS and future activities

Ibarlucea et al., *Analyst*, 138(3) (2013), 839-844

- On-chip optical detection of heavy metal ions

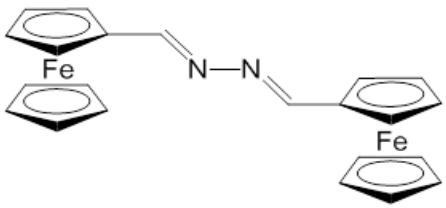




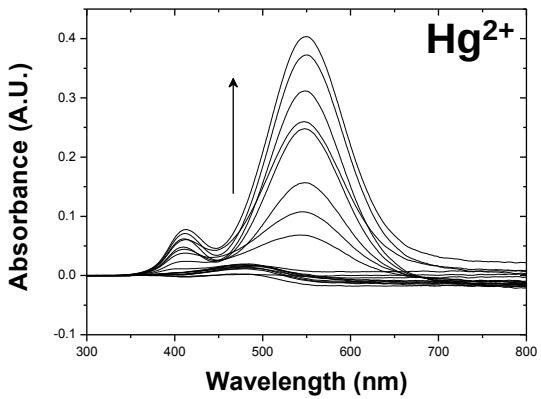
- Recognition of Hg^{2+} and Pb^{2+} by specific ligand results in new absorbance peaks

Achieved RESULTS and future activities

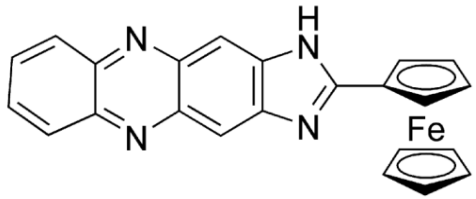
Ibarlucea et al., *Analyst*, 138(3) (2013), 839-844



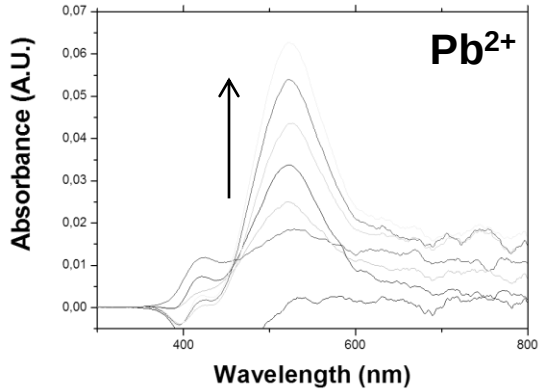
+ Hg^{2+}



Limit of detection: 2.59 µM



+ Pb^{2+}



Limit of detection: 4.19 µM

- Simplification of the measurement process and increase of the throughput of the analysis by simply combining on-chip detection and already existing colorimetric ligands

CONCLUSIONS

- Application of low-cost polymeric lab-on-a-chip systems for optical detection of heavy metal ions
- Easy to fabricate
- High degree of monolithic integration
- Air mirrors for lengthening the optical path and, in consequence, the absorbance signal, without increasing their overall size
- Measurements in continuous flow can be done for increasing the throughput