Detection and Characterization of Individual Micro- and Nanoparticles

Fact Sheet

Project Information

DECIMA

Grant agreement ID: 302991

Project closed

Start date
17 October 2012

End date
16 October 2014

Funded under
Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Total cost
€ 278 807,40

EU contribution
€ 278 807,40

Coordinated by
THE UNIVERSITY OF EDINBURGH
United Kingdom

This project is featured in...

Objective

"The Project aims to develop novel approaches for detection and characterization of particles in the critical nanometer – micrometer size range. An improved knowledge of the make-up and origin of such particles that are present in the atmosphere and working environments is crucial for understanding their role in atmospheric pollution and human health. The role of atmospheric particles in influencing climate behavior is also poorly understood and requires more sophisticated analysis techniques. The detection of neutral isolated nanoparticles is an extremely challenging problem. The compositions and structures of particles present in the atmosphere are largely unknown owing to limited measurement capabilities. Recently it has been shown that femtosecond laser ablation is a promising technique for nanoscale depth-resolved chemical analysis while graphene nanoresonators offer much promise as ultrasensitive mass detectors. This multidisciplinary Project includes two key areas that could revolutionize particle monitoring: (1) depth-resolution analysis of micro- and nanoparticles using fs laser ablation mass spectrometry and (2) the combination of nanoelectromechanical mass sensing and fs laser ablation mass spectrometry for the detection and elemental analysis of neutral nanoparticles. A dual time-of-flight mass spectrometer will be constructed for analysis of individual aerosol particles. The potential of fs-laser ablation mass spectrometry for providing a particle depth profile will be explored and tested on well-defined core-shell micro-/nanoparticles. In addition, the elemental analysis potential of fs laser ablation mass spectrometry will be coupled with sensitive neutral particle detection, using a graphene-based mass sensor that will be developed in the host group. The outcome of the Project will be in making an important step from fundamental concepts of particle detection and characterization to laboratory proof-of-principle studies and prototype development."

Fields of science (EuroSciVoc)

engineering and technology > nanotechnology > nano-materials > two-dimensional nanostructures > **graphene**

engineering and technology > electrical engineering, electronic engineering, information engineering > electronic engineering > **sensors**

natural sciences > earth and related environmental sciences > environmental sciences > **pollution**

natural sciences > chemical sciences > analytical chemistry > **mass spectrometry**

natural sciences > physical sciences > optics > **laser physics**

Programme(s)

FP7-PEOPLE - Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Topic(s)

FP7-PEOPLE-2011-IIF - Marie Curie Action: "International Incoming Fellowships"

Call for proposal

FP7-PEOPLE-2011-IIF
See other projects for this call

Funding Scheme

MC-IIF - International Incoming Fellowships (IIF)

Coordinator

THE UNIVERSITY OF EDINBURGH

EU contribution

€ 278 807,40

Total cost

No data

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Region

Scotland > Eastern Scotland > Edinburgh

Activity type

Higher or Secondary Education Establishments

Links

Contact the organisation Website
Participation in EU R&I programmes
HORIZON collaboration network

Last update: 25 May 2022

Permalink: https://cordis.europa.eu/project/id/302991