Flexible Optical Injection Moulding of optoelectronic devices

Grant agreement nº: 820661

Call identifier: H2020-NMBP-FOF-2018

Deliverable D8.9 a

Communication Kit

Work Package 8

Dissemination, Exploitation and Communication

Document type	:	Report
Version	:	V1
Date of issue	:	27th February 2019
Dissemination level	:	Public
Lead beneficiary	:	AIMEN

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement nº 820661.

Executive Summary

This report is part of the deliverables of Work Package 8, D8.9 Communication Kit. The report aims to gather all the information related about the FLOIM project including narrative text, photographs, slides and any other suitable communication material. This text targets a general audience, in order to show clearly the benefits the project can bring to society. This document will be updated during the project life.

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1 NARRATIVE TEXT FOR FLOIM DISSEMINATION

Miniaturized, integrated photonic devices are driving an increasing number of applications, while facing pressure to lower cost and increase flexibility.

Improving the cost efficiency, flexibility and environmental footprint of the complete integrated optoelectronics workflow, can provide European industry with a key tool for excelling in advanced applications and differentiating their products, while keeping production, innovation capacity and key Intellectual Property in Europe, which is the main goal of the FLOIM project.

Figure 1. LED array with injection moulding embossing.

The central concept on which the project rests is the overinjection of optical quality thermoplastic polymers directly on the active optoelectronic component, into a proper cavity that incorporates the geometrical micro and nanofeatures, which provide the polymer surface with the required optical functions.

This concept is grounded in the well-proven technology of Injection Moulding (IM) for high quality plastic optics (and variants like Injection Compression Moulding, ICM), extending the capabilities of the technique to enable a single step optical embedding. This single step process will substitute a number of operations usually required in production of optoelectronics, including microoptics production, handling, optomechanics attachment, positioning, alignment and encapsulation.

As an advanced development, the project will explore the generation of complex optical functions through replication of nanostructured mould surfaces, which can produce controlled diffractive effects -from lensing to wavelength splitting- extending the design space for extraordinary innovation potential and miniaturization. This will also reduce the number of assembled components, as discrete optics like diffusers or gratings could be directly moulded into the part.

The single step optical embedding will be enabled by a series of advances, result of the research activities during the project, which are supported by the solid competences of the consortium partners in their respective fields: tooling technology, injection moulding process development, optical design, sensing, inspection and advanced control.

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3 ANNEX: FLOIM PROJECT FLYER

Partners

AIMEN Technology Centre

www.aimen.es

Universitat Politècnica de Catalunya (UPC)

www.upc.edu

PROMOLDING

www.promolding.nl

HYBTRONICS MICROSYSTEMS

www.hybtronics.com

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www.mondragon-assembly.com

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ADAMA INNOVATIONS

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FLEXENABLE

www.flexenable.com

RECENDT

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www.iwu.fraunhofer.de

Ceit-IK4

www.ceit.es

SNELLOPTICS

www.snelloptics.com

www.floimproject.eu

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FLOIM is an initiative of the Factories of the Future Public Private Partnership

FLOIM

Flexible Optical Injection Moulding of optoelectronic devices

FLOIM concerns a new, automatized manufacturing technology for the production of optoelectronic components and the assembly of the corresponding optical system, based on the use of thermoplastic materials and the embedding of all the components into a compact and robust unique device. This technology permits to overcome current manufacturing limitations and magnifies the design possibilities.

The production chain for optoelectronic device manufacturing is inherited from microelectronics, which is not appropriate for novel, low cost, high efficiency photonic devices.

Project Duration:
42 months

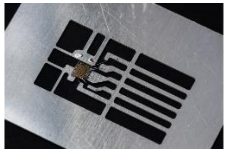
Starting project date:
1st of September, 2018
http://www.floimproject.eu/

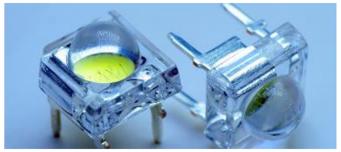
OBJECTIVES AND ADVANTAGES

FLOIM will pursue the following technical goals:

- Novel manufacturing chains for high quality integrated optical devices.
- Design new manufacturing equipment for functional optical embedding.
- Custom optical functions through mould insert machining and structuring.
- Sustainable production of eco-friendly optoelectronics.
- Disruptive applications

Miniaturized, integrated photonic devices are driving an increasing number of applications, while facing pressure to lower cost and increase flexibility.





Improving the cost efficiency, flexibility and environmental footprint of the complete integrated optoelectronics workflow, can provide European industry with a key tool for excelling in advanced applications and differentiating their products, while keeping production, innovation capacity and key Intellectual Property in Europe.

MAIN INNOVATIONS

The innovations to be generated during the project have been identified and categorized into two categories:

1. Product and Process design principles:
    - Optics design for highly integrated optical integration and embedding.
    - High quality optical injection moulding.
2. Manufacturing Platform:
    - Integrated optical embedding technology, for High-precision injection moulding using modular and reconfigurable mould with quick insert exchange, and optical function reconfiguration by selective restructuring of diffractive insert nanostructures.
    - In line quality assessment, full quality evaluation and zero defect goal.
    - Compatible continuous part handling, control software system and mechatronic peripherals.

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