

# Roll-2-Roll and Photolithography post-processed with LASer digital technology for FLEXible photovoltaics and wearable displays – RoLA-FLEX

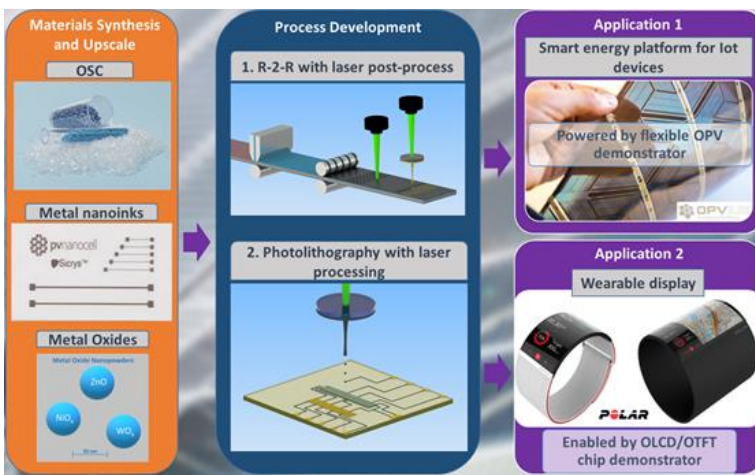
## Introduction:

RoLA-FLEX is an industry driven project which provides innovative solutions to the challenges associated with performance and lifetime of existing Organic and Large Area Electronics (OLAE). OLAE advancements have offered the potential of creating new and sustainable manufacturing sites in Europe, with significantly less toxic waste produced during the process. Despite the advancements of OLAE the use of organic semiconductors has not yet revolutionized consumer electronics and alternative energy related sources. The current wider market penetration of OLAE is blocked by scientific and engineering challenges to be overcome. The RoLA-FLEX project addresses these challenges by focusing on materials, process development and prototype applications.

## Goals of the project:

The overall goal of RoLA-FLEX is to develop:

- Materials:** Solution processed organic and inorganic electronic materials designed according to the end-user requirements for charge carrier mobility, conductivity and environmental stability, developed at TRL5+ and scaled-up at industrial quantities with high uniformity.
- Processes:** Innovative OLAE manufacturing processes, by seamlessly introducing laser printing, sintering and patterning in OLAE process lines, the goal of which is to achieve five times higher resolution with respect to R2R OPV module interconnection, ten times shorter lead time for photolithographic processing of OTFTs, and 50% reduced cost for both.
- Devices:** Demonstration of two TRL5+ OLAE prototypes: 1) a smart energy platform for IoT devices powered by OPVs, 2) a next-gen smart watch incorporating a flexible OLCD



**RoLA-FLEX**

## Project facts:

Start date: 01/05/2020  
End date: 30/04/2023

Duration in months: 36

Project budget: 5.8 mln €  
EU contribution: 4.7 mln €

H2020 Innovation Action  
Grant Agreement no.: 862474

Call (part) identifier:

DT-NMBP-18-2019

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Topic:

Materials, manufacturing processes and devices for organic and large area electronics

Keywords:

OLAE, Laser processing, R-2-R, photolithography, organic photovoltaics, flexible displays, wearable electronics

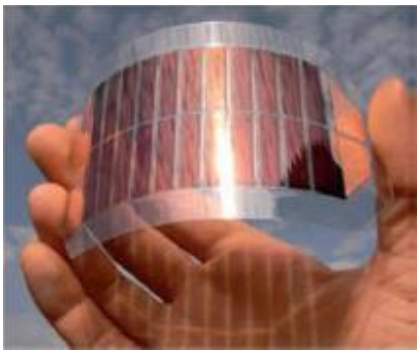
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**Expected Impact:**

The RoLA-FLEX project will make a significant contribution to the technological readiness of OLAE. The applications developed within the project open up new market opportunities answering apparent market needs – independent, discreet and always available source of “green” energy, as well as thinner, lighter and flexible wearables that adapt to the user, rather than the other way around.

The project focuses on the demonstration of two TRL5 prototypes employing innovative OLAE processes:

- OPV integrated smart energy management platform that powers IoT devices
- Smart watch with an ultra-bright flexible display using OLED with OTFT array backplanes made from high performance organic semiconductor materials.



The project is bringing together key European players, each one being among the top performers in their respective field in Europe and worldwide. Most of the partners have wide experience with other international research projects in the OLAE area and have collaborated between themselves on numerous occasions. The RoLA-FLEX consortium has a diverse, multi-disciplinary and complementary expertise that enables it to support European industry with new disruptive knowledge which will be implemented through their products and services and will allow them to expand know-how to other markets as well, such as smart homes and automobiles.



**Consortium:**

|         |                |
|---------|----------------|
| NTUA    | Greece         |
| TNO     | Netherlands    |
| ASPF-FR | France         |
| CUT     | Cyprus         |
| FLEX    | United Kingdom |
| PVN     | Israel         |
| AVA     | Switzerland    |
| PCAS    | France         |
| ASPF-DE | Germany        |
| POLAR   | Finland        |
| AMI     | Czech Republic |
| UOXF    | United Kingdom |

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