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H2020 Grant for perovskite-based lighting, wearables and fabric devices with LiFi and photovoltaic capability has been approved and started April 1st 2020

The EC is now boosting the impressive research activities in the field of perovskites by the PeroCUBE project, which is funded under Horizon 2020. On April 1, 2020, 14 European partners from industry and science in ten countries launched the joint project to develop new applications in the fields of lighting, photovoltaics and telecommunications. Researchers from the Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP in Dresden are involved in the project and will contribute their expertise over the next 3,5 years.

Perovskites are an emerging technology for OLAE-based devices that have the potential to revolutionize the photovoltaic sector and also the lighting sector. They are a class of low-cost but high-quality materials which exhibit performance similar to “conventional” semiconductors while they can be processed by simple and cheaper means. Perovskites have strong potential to dominate the OLAE market with the focus given on flexible, lightweight electronic devices. They are intensively studied and optimized for energy generation applications as they are considered the next “big thing” in photovoltaics (PVs) with efficient perovskite-based PVs will be introduced to the market in the next five years. Recently, perovskites have been demonstrated to yield efficient light-emitting devices.

EU H2020-funded project PeroCUBE aims at developing flexible, lightweight perovskite-based electronics, creating new commercial opportunities for the lighting, energy and telecom industries. The consortium brings together 14 industrial and academic partners from 10 European countries.

This innovative collaboration, which engages the industry, academia and research organizations, represents the whole value chain and breeding ground needed to develop a new generation of sustainable perovskite-based devices. Already seen as a promising game-changer for the energy sector, this European consortium will allow the demonstration of the technology’s viability as a commercial product. The project will last 42 months for a total requested EU contribution of EUR 5.6M.

The organic-inorganic metal halide 3D and lower dimensional semiconductors (usually referred to these days as perovskite), already used in PV technologies, have a strong



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potential to dominate the OLAE (Organic and Large Area Electronics) market by providing advanced lighting solutions (Perovskite based LED, Pe-LED).

PeroCUBE has two main objectives:

- producing efficient, simple and low cost light sources closer to natural light sources and
- supporting the development of more stable and sustainable, efficient and low-cost solar panels.

By combining these promising technologies, the consortium seeks to develop a new generation of Visual Light Communication (VLC) and LiFi (light fidelity) standard, widening the scope for human centric lighting (HCL), data transmission, wearables and IOT applications that do not cause harm to humans nor the environment.

Accelerator for the European lighting industry

The partners in the consortium agree that the project will take the development of perovskite-based optoelectronic devices a step further. Within "PeroCUBE" large area illumination panels will be developed, which provide homogeneous illumination according to the concept of human-centered illumination. Such components will offer excellent value for money and help European industry maintain its industrial leadership in the field of lighting. This should open new doors for the industry. Dr. Sylvain Nicolay of CSEM is certain: "PeroCUBE will provide proof that the specific class of perovskite materials can actually be used in commercial objects such as light panels and wearables".

Dr. Christian May, Head of Division Flexible Organic Electronics at the Fraunhofer FEP, explains the role of the Fraunhofer FEP within PeroCUBE: "Our researchers are very pleased to be able to contribute to the development of this fascinating technology. Perovskite technology is undergoing a development that is as rapid and fascinating as OLED technology. Therefore, we would like to use our extensive know-how in the characterization and encapsulation of large-area and flexible OLEDs and achieve a reasonable combination of these technologies".

About PeroCUBE

The PeroCUBE – High-Performance Large Area Organic Perovskite devices for lighting, energy and Pervasive Communication – consortium consists of 14 partners. Namely:

1. **CSEM SA (CH)** as coordinator and leader for the development of perovskite-based PV devices;
2. **VTT (FIN)** manufacturing approaches for Large Area flexible PeroCUBE devices and their integration into wearables;
3. **University of Oxford (UK)** for developing LED and PV device technologies;
4. **University of Patras (GR)** for tuning the perovskite upscaled industrial synthesis as well as providing improved perovskite structures;
5. **Fraunhofer FEP (GER)** for electro-optical characterization of PeLED devices and their encapsulation;
6. **Aura Light Italia (IT)** as integrator of lighting applications, innovation, dissemination and IPR management;
7. **TNO (NL)** for Life Cycle Assessment and hazard and nanotoxicity assessment which will take into account the benefits as well as the potential risks of PeroCUBE devices across various life cycle stages of the product;
8. **CNRS (F)** for the optimization of the perovskite material;
9. **Vodafone Innovus (GR)** for light fidelity connectivity applications;
10. **Technische Universität Wien (AT)** developing micron- and nanoscale characterization of packaged PE-LED devices and PE-LED materials;
11. **Alpes Laser SA (CH)** for the laser source for perovskite characterization;
12. **Eulambia Advanced Technologies Ltd. (GR)** for the Perocube transceiver integration;
13. **Optiva Media (ES)** for the implementation and validation of the PeLiFi demonstration prototype;
14. **Noesis Technologies (GR)** for project, data and IPR management and exploitation support.

The PeroCUBE project has received funding from the European Union's Horizon 2020 research and innovation program under Grant Agreement No. 861985 with an overall budget of EUR 5.6M.

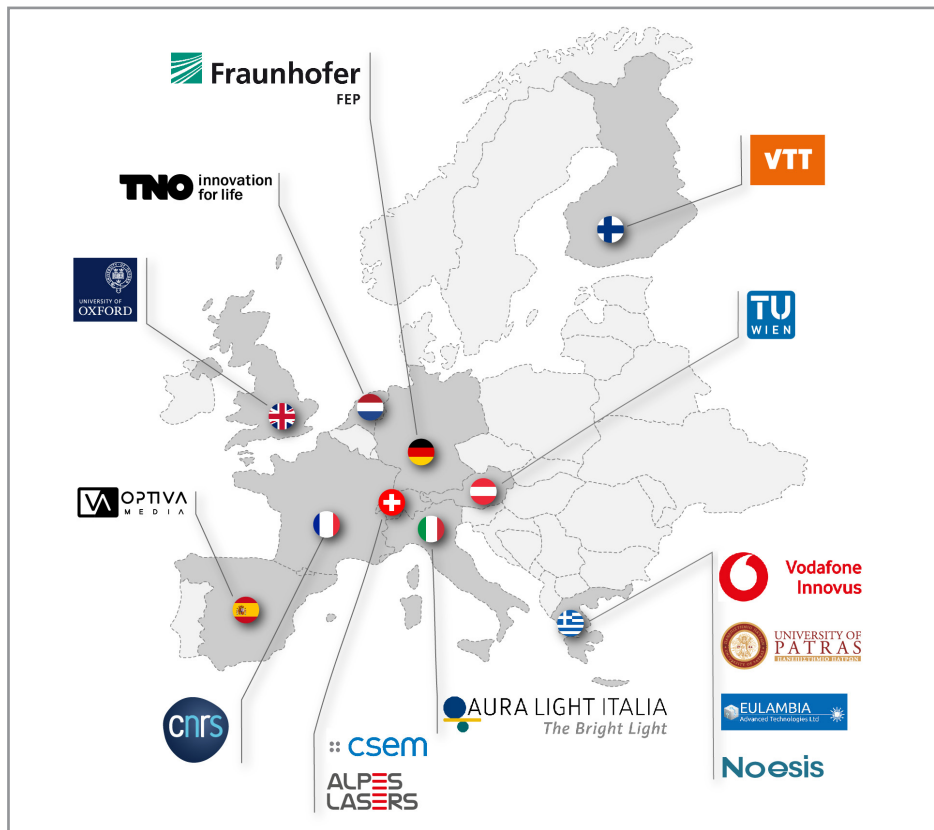
<https://cordis.europa.eu/project/id/861985>

The project website is under preparation and will be launched in Q4 2020.

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PeroCUBE partners

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The **Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP** works on innovative solutions in the fields of vacuum coating, surface treatment as well as organic semiconductors. The core competencies electron beam technologies, roll-to-roll technology, plasma-activated large-area and precision coating as well as technologies for organic electronics and IC design provide a basis for these activities. Thus, Fraunhofer FEP offers a wide range of possibilities for research, development and pilot production, especially for the processing, sterilization, structuring and refining of surfaces as well as OLED microdisplays, sensors, optical filters and flexible OLED lighting. Our aim is to seize the innovation potential of the electron beam, plasma technology and organic electronics for new production processes and devices and to make it available for our customers.