PHOtoactivated Metal Oxide TRansport layers for Indoor Perovskite Photovoltaics

Fact Sheet

Project Information

**PHOMOTRIPP**
Grant agreement ID: 101111407

**Start date**  
1 September 2024

**End date**  
31 August 2026

**Funded under**
Marie Skłodowska-Curie Actions (MSCA)

**Total cost**
€ 0,00

**EU contribution**
€ 188 590,08

**Coordinated by**
UNIVERSITA DEGLI STUDI DI ROMA TOR VERGATA  
 Italy

Objective

Harnessing indoor lighting available in buildings has the potential to power the next generation of Internet of Things, creating a more environmentally and economically sustainable ecosystem to accelerate future innovation. Indoor photovoltaics enable this by utilising artificial light sources such as white light-emitting diode and fluorescent lamps to negate the limitations imposed by battery-powered systems. Among the emerging photovoltaic technologies, indoor perovskite solar cells display immense promise and require further study to reach their true potential. The electron transport layer, an integral part of the perovskite solar cell architecture, is of particular interest as its optimisation can lead to overall enhancement of device
performance in indoor conditions. Popular metal oxide-based electron transport layers, that offer solution processability, tunable electronic properties, high carrier mobility, and favourable energy level match with the perovskite, continue to suffer from high temperature processing and interfacial defects. Lowering the processing temperature to increase compatibility with flexible devices, diversifying the metal oxide family to develop a wider choice of materials, and formation of metal oxide composites to augment charge transfer and stability, are some measures that can overcome the challenges of the present transport layers and further enhance their properties. This study attempts to achieve this by innovatively combining low temperature photo-annealing and graphene incorporation to produce high quality films of conventional and novel metal oxides, that can be employed in indoor perovskite solar cells to improve overall device efficiency and stability. This proposal is a focussed but significant attempt to fill the gap arising from a lack of concentrated study on electron transport materials, more specifically inorganic metal oxides in the domain of indoor perovskite solar cells.

**Fields of science**

- engineering and technology > nanotechnology > nano-materials > two-dimensional nanostructures > graphene
- natural sciences > computer and information sciences > internet > transport layer
- engineering and technology > materials engineering > composites
- natural sciences > chemical sciences > inorganic chemistry > inorganic compounds
- engineering and technology > environmental engineering > energy and fuels > renewable energy > solar energy > photovoltaic

**Keywords**

- electron transport materials
- metal oxide
- graphene composite
- sol-gel
- photo-annealing
- indoor perovskite solar
- cell
- flexible photovoltaics
- energy harvesting

**Programme(s)**

- HORIZON.1.2 - Marie Skłodowska-Curie Actions (MSCA)
HORIZON-MSCA-2022-PF-01 - MSCA Postdoctoral Fellowships 2022

Call for proposal

HORIZON-MSCA-2022-PF-01

See other projects for this call

Funding Scheme

HORIZON-TMA-MSCA-PF-EF - HORIZON TMA MSCA Postdoctoral Fellowships - European Fellowships

Coordinator

UNIVERSITA DEGLI STUDI DI ROMA TOR VERGATA

Net EU contribution
€ 188,590,08

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Region
Centro (IT) > Lazio > Roma

Activity type
Higher or Secondary Education Establishments

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

Other funding
€ 0,00

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