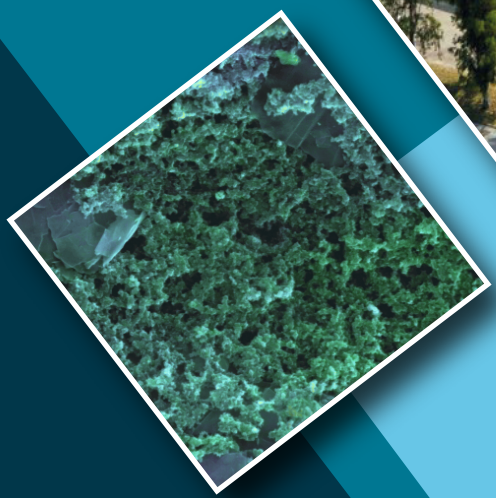
BUSINESS OPPORTUNITIES

CARBONPASTE

An innovative formulation for photovoltaics and printed electronics

The conductive paste can be applied in perovskite photovoltaics for improving efficiency and stability while reducing costs. It is compatible with sensitive halide perovskite materials.



ICN2

Institut Català de Nanociència i Nanotecnologia

APPLICATION LANDSCAPE AND NEED

Energy is essential for the development of civilization. The global electricity demand has increased over the last few years, and there is a growing need for the transition from fossil fuels to renewable energy sources. Photovoltaic energy uses the sun's energy to produce electricity, besides that, it is renewable, sustainable, and environmentally friendly. Perovskite solar cells (PSCs) have revolutionized photovoltaic research. Although this efficiency is comparable with silicon solar cells, degradation of the metallic counter electrodes is a problem to be solved.

Carbon perovskite solar cells using carbon-based counter electrodes promise to mitigate instability issues and replace the costly metal (Au, Ag) electrodes, while providing simple processing and low-cost device configurations. Carbon paste offers unique advantages, such as enhanced electrical conductivity, improved stability, and cost-effectiveness, making it a key player in advancing perovskite solar cell technology towards widespread adoption. However, its application presents several significant challenges that need to be overcome to ensure the optimal performance and durability of these solar cells, focused on improving the stability and durability of carbon paste.

INNOVATION

The Catalan Institute of Nanoscience and Nanotechnology (ICN2) has developed CARBONPASTE, an innovative carbon paste composition compatible with perovskite solar cell technology.

With the aim to unlock the full potential of perovskite solar cells by mitigating the challenges associated with carbon paste, the present invention relates to a unique composition of our carbon paste special formulation and tailored mixture of solvents. Our carbon paste allows us to keep the temperature low during the processing, preserving the structure of the metal halide perovskite layer, which can improve long-term stability of cells. Furthermore, the solvents mixture has been selected to be inert with respect to metal halide perovskites, thus it can be safely applied directly onto it. The composition can be employed in other applications within printed electronics, such as electrodes or electronic circuits.

APPLICATIONS

An electrically conductive paste specifically compatible with perovskite solar cells. It can also be employed in other optoelectronic devices, in printed electronics and related of devices. Electrode for perovskite solar cells and Printed Electronics.

KEY ADVANTAGES

- Better efficiency and higher long-term stability of carbon perovskite solar cells
- Lower temperature in the curing process
- Lower manufacture costs of carbon perovskite solar cells
- Lower toxicity of components

STAGE OF DEVELOPMENT

CARBONPASTE is at the prototype stage. The high-performance properties were experimentally validated under laboratory conditions and benchmarked against four analogous commercial products. The resulting electrodes are compatible with halide perovskite materials both chemically and thermally. The devices have been tested for indoor and outdoor stability following ISOS protocols.

BUSINESS OPPORTUNITY

The ICN2 is looking for industrial partners interested in licensing the technology and/or collaborating on industrial prototyping and testing in relevant environment.

INTELLECTUAL PROPERTY: European patent application filed in March 2024 (EP24382301).

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