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## Centre for Hybrid & Organic Solar Energy

PowerCoat HD enables groundbreaking advancements in the performance of paper-based solar cell technology.

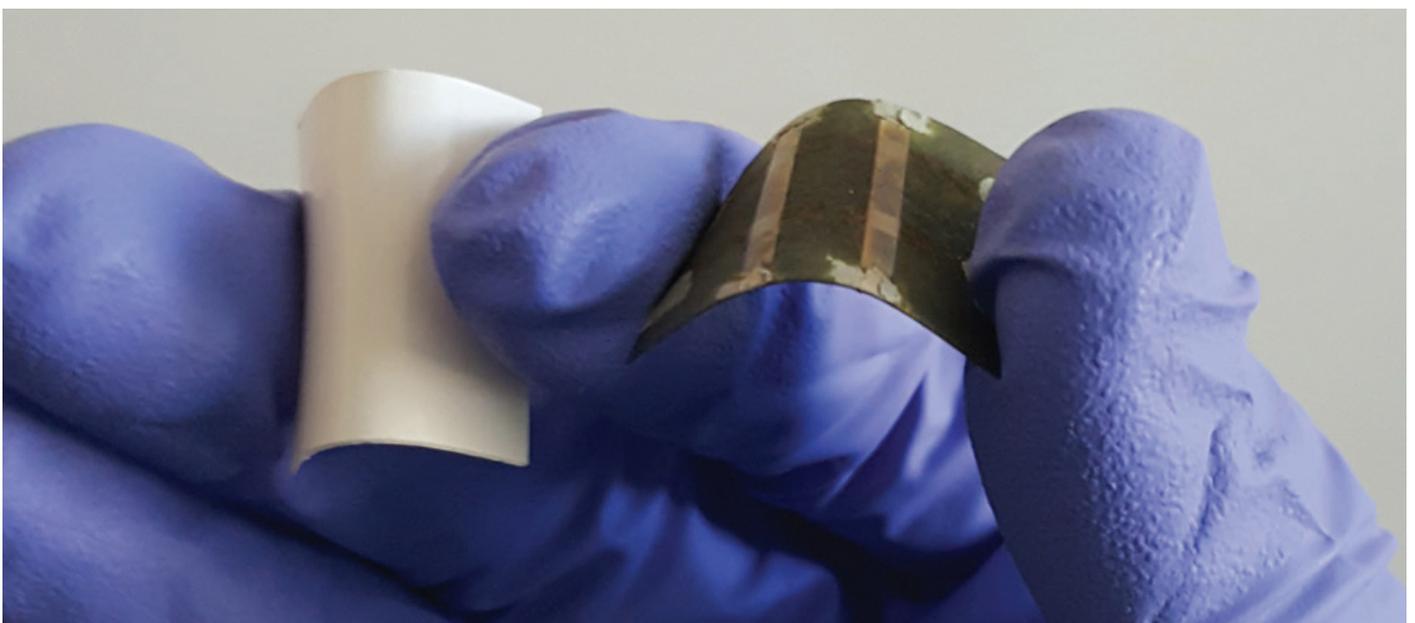
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## Centre for Hybrid & Organic Solar Energy

First demonstration of perovskite solar cell technology on paper substrate. A move towards a low-cost power source on environmentally friendly and recyclable substrate.

Perovskite solar cells have been attracting great attention from the scientific and industrial communities in the past few years because they are able to combine high power conversion efficiencies that are approaching those of silicon together with simple manufacturing processes. The films that make up the cells are in fact cast from solution (i.e. printed via inks) or evaporated over large areas.



Researchers at the Centre for Hybrid and Organic Solar Energy (CHOSE), Department of Electronic Engineering University of Rome - Tor Vergata, have manufactured the first perovskite solar cell directly on a paper substrate. The developments that enabled this breakthrough were a top MoOx/Au/MoOx transparent electrode, a bottom Au/SnO2 electrode, and a low temperature UV-irradiated mesoporous TiO2 scaffold. Results have recently been published in IEEE Electron Device Letters.

The efficiency was 2.7% which the researchers believe is state of the art for a solar cell directly deposited on a flexible opaque paper substrate. They also highlight the steps that can lead to 10% efficiency or greater in the future by analysing performance of cells on different substrates and with different electrodes. As stated by Prof. Thomas M. Brown who led the team composed of researchers from Colombia, India and Italy: "Future work will focus on improving the transmittance vs resistivity properties of the contact through which light is shone, the quality of the bottom electron-extracting contact, the interface with the underlying substrate as well as stability of the device."

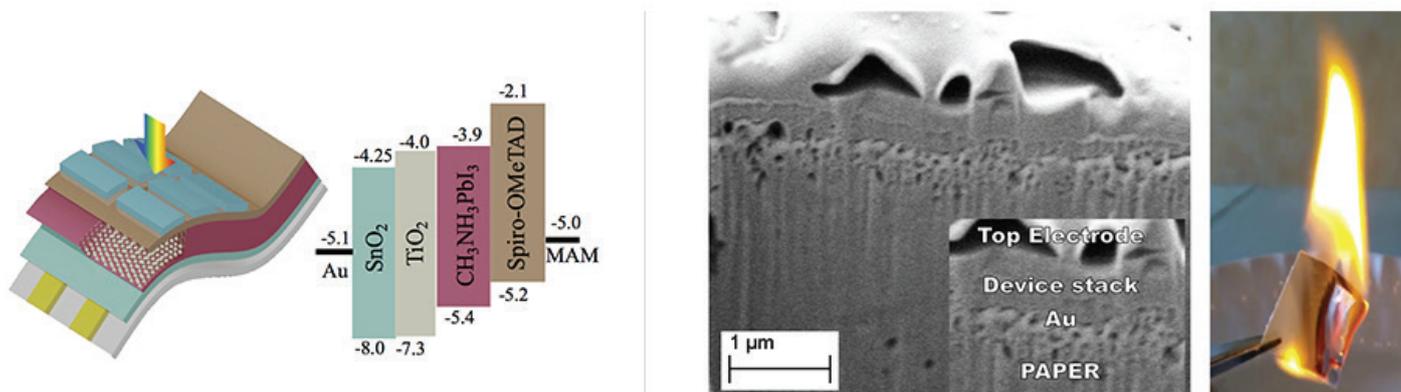


Figure: CHOSE - First demonstration of a perovskite solar cell on paper (IEEE Electron Device Letters)

Paper represents a lightweight, flexible, inexpensive, ubiquitous, and environmentally friendly cellulosic material opening up new possibilities for power generation including one that is disposable. All solar cell deposition processes are scalable and compatible with large area printing or evaporation technologies, making the technology easy to integrate with other electronic components based on organic and hybrid semiconductors on the same paper substrate. This sets the stage for powering paper-based electronics in the future as well as for the development of independent light-harvesting photovoltaic devices on recyclable and low-cost cellulosic substrates.

The results have been published in IEEE Electron Device Letters:

"Perovskite solar cells on paper and the role of substrates and electrodes on performance"

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[Download the paper here.](#)

### About the Centre for Hybrid and Organic Solar Energy (CHOSE)

The Centre for Hybrid and Organic Solar Energy (CHOSE) was founded in 2006 from the will of the Lazio Region and the University of Rome Tor Vergata to create a center of excellence in the field of next-generation photovoltaics. CHOSE is distributed across several laboratories including the new main laboratory within the Campus of Tor Vergata University in Rome. The latter consists of a more than 400 square meter laboratory that houses equipment for the fabrication and characterization of organic, hybrid, dye sensitized and perovskite photovoltaic cells, modules and panels. The other laboratories, totalling roughly 300 square meters in extension, are located within different departments of Tor Vergata. More than 25-30 researchers work at CHOSE including graduate students, postdocs and staff. CHOSE has also many collaborations at the regional, national and international levels.

The main objectives of CHOSE consist in the development of fabrication processes for organic and hybrid organic / inorganic solar devices, the definition of a process for the industrialization of these innovative photovoltaic technologies, the technological transfer of these and the development of photovoltaic applications in collaboration with companies at both the domestic and international level.

Source: Centre for Hybrid and Organic Solar Energy (CHOSE)

<http://www.chose.uniroma2.it/en/>

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