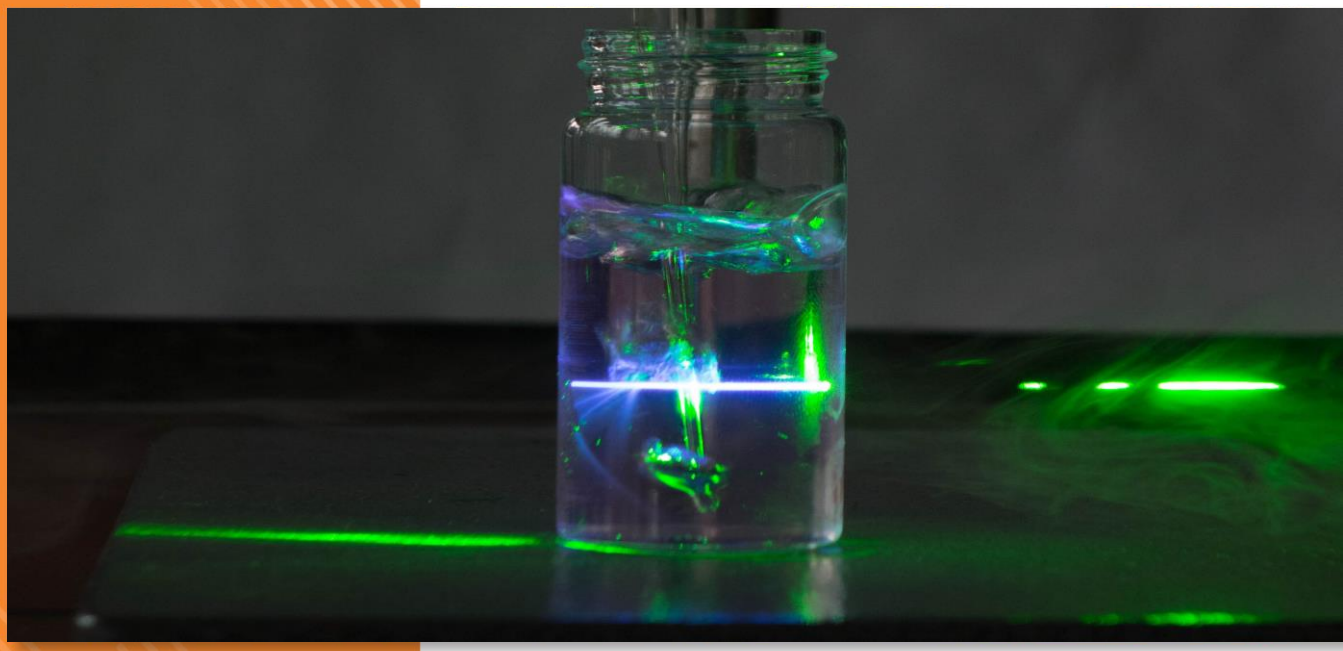

Printed perovskite solar cells and modules on flexible substrates and their integration with energy storage systems

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Flexible perovskite solar cells (f-PSCs) have recently reached power conversion efficiency (PCE) as high as 20.7% in single junction configuration and a certified efficiency of 24.4% in tandem configuration. Although still lagging behind their rigid counterparts on glass, which in very short time have achieved a certified efficiency of 25.7% in single junctions and 32.5% in tandems with Silicon, the use of flexible substrates opens up to a wide range of applications, from sensors for the Internet of Things, to the retrofitting of existing buildings to improve their energy efficiency (building-applied PV), to space, thanks above all to the high power/to weight ratio generated which is the range of 29.4 W/g compared to 8.31 W/g for amorphous silicon and 0.254 W/g for ultra-thin CdS / CdTe.

For IoT applications, the integration of f-PSCs with flexible storage system is required to overcome the discontinuous illumination. In literature, the integration of the two devices has been demonstrated only on rigid substrates, with a maximum operating voltage of 0.84 V when the supercap is charged by a single solar cell.

In this presentation, the fabrication of flexible perovskite devices, used for IoT and space applications, will be reported. A special focus will be on the role of the scaling up of the realization process from solar cells to module which allowed the FPSMs to deliver 12% PCE and negligible hysteresis on 16.8 cm^2 and 11.7% PCE on 21.8 cm^2 active area.

In addition to that, the integration of the solar cells and modules with printed supercapacitors realized with environmentally friendly materials with will be presented highlighting the potentiality of this integrated system and its application to power IoT electronics.

1. März 2023
16:00 Uhr
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