

FLEXIBLE AND FLOATING PHOTOVOLTAICS

We present our results on dye sensitized solar cells (DSSCs) for flexible[1] or floating[2] photovoltaic devices. In these works, we used polymer electrolyte membranes and metal grids as electrodes substrates in order to preserve the flexibility of the entire structure. These cells aim to be competitive in the near future solar market due to the extremely low cost and easiness of processing. Moreover, they evidently improve their conversion efficiency under low illumination conditions.[3] This feature makes flexible DSSCs extremely interesting to be exploited in particular applications.

In addition, we also introduce a smart integration of a DSSC with an electrical double layer capacitor (EDLC) which employs graphene nanoplatelets as active material in a completely flexible architecture.[3] To the best of our knowledge this harvesting-storage (HS) device has the best overall photon-to-electrical conversion and storage efficiency ever attained to date for a flexible DSSC-based non-wired integrated HS device. Noteworthy, this value increases lowering the radiation intensity, thus showing optimal performances in real operation or indoor conditions.

References

- [1] M. Gerosa, A. Sacco, A. Scalia, F. Bella, A. Chiodoni, M. Quaglio, E. Tresso, S. Bianco, Toward Totally Flexible Dye-Sensitized Solar Cells Based on Titanium Grids and Polymeric Electrolyte, *IEEE J. Photovoltaics*. 6 (2016). doi:10.1109/JPHOTOV.2016.2514702.
- [2] F. Bella, A. Lamberti, S. Bianco, E. Tresso, C. Gerbaldi, C.F. Pirri, Floating, Flexible Polymeric Dye-Sensitized Solar-Cell Architecture: The Way of Near-Future Photovoltaics, *Adv. Mater. Technol.* 1 (2016) 1–9. doi:10.1002/admt.201600002.
- [3] A. Scalia, F. Bella, A. Lamberti, S. Bianco, C. Gerbaldi, E. Tresso, C.F. Pirri, A flexible and portable powerpack by solid-state supercapacitor and dye-sensitized solar cell integration, *J. Power Sources*. 359 (2017) 311–321. doi:10.1016/j.jpowsour.2017.05.072.