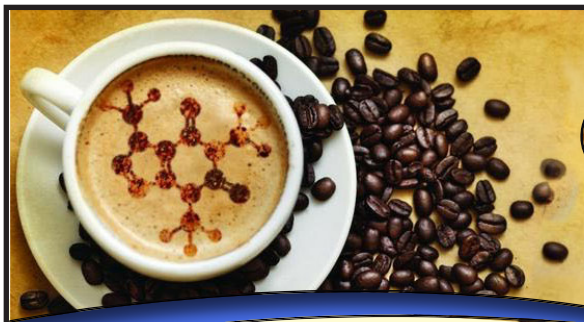
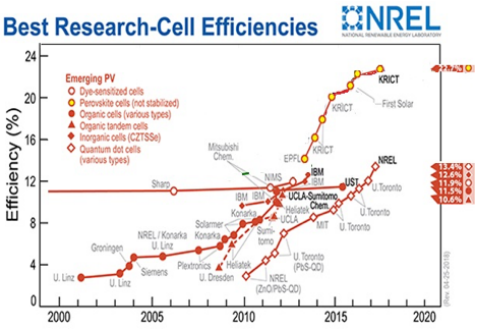


CoffeeTalk@ISOF

Organic solar cells: materials, characterization and devices

Francesca Tinti
CNR-ISOF

Due to the abnormal increase of energy request for the human activities and to the consequent exhaustion of fossil fuels, it was necessary to concentrate the efforts of the research to find alternative energetic sources.
The development of solar cells for the production of electricity is an extremely florid and active field of research, where organic solar cells have great importance. In particular solution-processed bulk-heterojunction (BHJ) solar cells, with active layer composed of an electron-donating and an electron-accepting material that could be a conjugated polymer or a small organic molecule or a fullurene derivative, have great advantages over solar cells made of silicon: lower manufacturing costs, fabrication of large area solar module flexible and lightweight. However one of the great obstacles that limit their wide diffusion is certainly the low efficiency in energy conversion.
In this last twenty years a lot of work was done to overcome this problem and now the power conversion efficiency (PCE) of this kind of cell reaches over 14%, very close to the limit value of 15% to make this technology suitable for industrial scale up. This goal has been achieved thanks to many factors: the development of new donor materials (e.g. with diversified building blocks containing halogen atoms) and of new acceptor materials (like non-fullerene acceptor molecules NFA), the introduction of new device architectures and a better comprehension of the device physics.



Last theoretical studies have shifted the limit of PCE to be reached above 20% promising a bright future for organic solar cell.

Chem. Rev., 2015, 115, 12666; J. Mat. Chem. A, 2016, 4, 5340; Small Methods, 2017, 1, 1700258; Nano Energy, 2018, 48, 413; Chem. Rev. , 2018, 118, 3447; Nature Materials, 2018, 17, 119

Tuesday 3 July 2018, 14:30
ISOF 12 – Meeting Room (1st floor)
CNR Research Area
Via Gobetti 101, Bologna

Follow us on facebook: http://www.facebook.com/coffeetalkisof