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# Interfaces and interfaces in organic photovoltaics

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## ABSTRACT

Development of sustainable technologies for energy generation is one of the biggest scientific and technological challenges of this century. Over the past decades, organic photovoltaics (OPV) have continued to make progress towards becoming a commercially-viable sustainable technology for energy generation. Bulk-heterojunction organic photovoltaics are dominated by the properties of organic-organic and organic-inorganic interfaces. Interface engineering plays a critical role for the optimization of performance, processing and lifetime of organic photovoltaics.

In the first part of this talk, I will describe recent advances towards development of air-processable low work function electrodes that have led to single-cell OPVs, tandem OPVs and OPVs modules with improved performance. I will describe how these electrodes have led to innovative OPV geometries including all-plastic OPVs, OPVs cellulose nanocrystal substrates which can be recycled at room temperature and OPV modules with power conversion efficiencies that are comparable to single cell OPVs. These advances represent a step forward towards demonstrating that OPVs can be a viable sustainable technology.

In the second part of this talk, I will describe how interface engineering also plays a critical role in reducing parasitic resistance effects. OPVs with very high shunt resistance values are both scientific and technologically relevant since they allow direct access to intrinsic physical properties of the bulk heterojunction, refining our understanding of the energetic landscape in an OPV, and also lead to organic photodetectors that display a photodetector performance that surpasses that displayed by commercial Si-photodiodes.