

# **Robust silver electrodes for high performance organic photovoltaics**

Jaemin Lee(J.Lee.2@warwick.ac.uk), Ross A. Hatton

University of Warwick

## **Abstract**

Organic photovoltaics (OPVs) have strong potential for various applications such as consumer electronics and building or design integration applications, based on their light weight, feasibility to colour tuning and recent advances in the power conversion efficiency up to 17.3%. At the same time optically thin silver (Ag) films with a thickness of 6-15 nm are promising as the basis for flexible transparent electrodes well-matched to the needs of OPVs. However, due to the high surface energy of silver and its susceptibility to sulfurization and oxidation in air, very thin evaporated Ag films are morphologically unstable even at room temperature. Consequently, for practical application there is a need to identify an easily implementable and versatile means of imparting long term stability of both Ag electrode and OPV device. This talk will describe how a single layer of a bifunctional small molecule deposited from the vapor phase can greatly enhance the morphological and chemical stability of optically thin Ag film electrodes. Due to its very low thickness (~1 nm) this organic layer does not electrically isolate the electrode. It is shown that in 10% efficient inverted OPVs substantial improvements in device stability are achieved by inclusion of this layer, which is remarkable given its very low thickness.

**Keywords:** *Solar cells, Transparent electrodes, Silver electrodes, Nanostructures*