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Low cost carbon-based printed perovskite solar cell technology

An opportunity for entire world

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Abstract:

Among different configurations of PSCs, the hole transporting material (HTM) free carbon back contact electrode

based printable mesoscopic perovskite solar cells (CPSCs) have drawn significant attention due to promising characteristics, e.g., abundant availability of incorporated materials, i.e., TiO_2 , ZrO_2 and carbon nanoparticles, elimination of costly HTM (e.g. Spiro OMeTAD) and high stability in different simulated and natural environmental conditions ¹⁻⁵. I will present in my talk some of my outstanding results related to this emerging photovoltaic technology, which includes the replacement of manual infiltration of perovskite precursor ink with automated inkjet infiltration ¹, first ever demonstration of exceptional stability of these carbon based printed exceptional stability under intense UV light illumination ² and a significant discovery regarding perovskite crystals growth in the thermo-humid environment, which was generated in a humidity chamber. As a result, the initial photovoltaic performance of these carbon-based printed perovskite solar cells was drastically improved (> 50%) and the initial hysteresis in the fabricated devices was remarkably suppressed as a result of improved inter-particle connectivity of each layer via perovskite crystals growth ³.

The technology provides an outstanding opportunity for any country in the world to realize it's potential for an affordable solar-to electrical energy conversion in a complete clean room free based processing, which cannot be realized either in Si based photovoltaics system or other emerging solar cells technologies.

References:

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