International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI)

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Large area carbon based perovskite solar cell

Overview

About 50% of the production costs of perovskite solar cells (PSCs) are accorded by the organic hole transporting materials (HTM) and the metal back contact. Using a highly conductive carbon electrode to replace both organic HTM and the metal back contact cuts down the production cost by 50%. Carbon-based materials, when used as back contacts in HTM-free PSCs, have been proved to be a class of cheap, stable, water-proof, and anticorrosive materials. By using screen printing technique large area with high uniformity and reproducible carbon based PSC can be made. As ongoing work, 100mm X 100mmcarbon based perovskite modules were developed.

Key Features

- Low material and production cost
- Highly stable perovskite devices

Potential Applications

- Off-grid power supply
- Building integrated photovoltaics (roof, tiles)
- Solar road studs

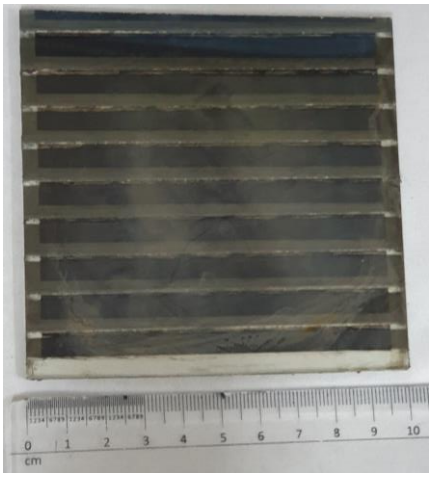

Figure: Large area carbon based perovskite solar cell

Major Patents/Publications

- Room temperature curable carbon cathode for hole-conductor free perovskite solar cells, Solar Energy, Accepted

IPDI*	1	2	3	4	5	6	7	8	9	10
Activities	*Basic concepts and understanding of underlying scientific principles*	*Short listing possible applications*	*Research to prove technical feasibility for targeted application*	*Coupon level testing in stimulated conditions*	*Check repeatability/ consistency at coupon level*	*Prototype testing in real-life conditions*	*Check repeatability/ consistency at prototype level*	*Reassessing feasibility (IP, competition technology, commercial)*	*Initiate technology transfer*	*Support in stabilizing production*
Status										