

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

Balapur P.O., Hyderabad – 500005, Telangana, India



Flexible and lightweight CuInGaSe_2 (CIGS) solar cells on stainless steel foil substrates for portable charging applications

Overview

CIGS-based solar cells are one of the most promising thin film solar cell technology with steadily improving cell efficiencies and large-scale commercial manufacturability. Although conventional CIGS technology was established on rigid glass substrates, significant progress has been made during the last decade in the direction of developing 'flexible' CIGS panels made on polymer film and metal foil substrates. This has opened a niche market for CIGS based products in the form of standalone charging solutions for transportation systems and portable electronics. At ARCI, flexible CIGS solar cells are being developed on stainless steel foils for use in portable charging applications.

Key Features

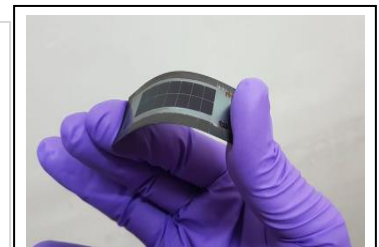
- Well established vacuum based sputtering and selenization route for making high quality CIGS absorbers on flexible substrates
- Easily scalable, dip coated Fe-diffusion barrier layer between SS substrate and Mo back contact
- Thin, flexible and lightweight CIGS mini-modules
- Possibility to integrate CIGS base charging solution into common daily use items like backpacks and umbrellas

Potential Applications

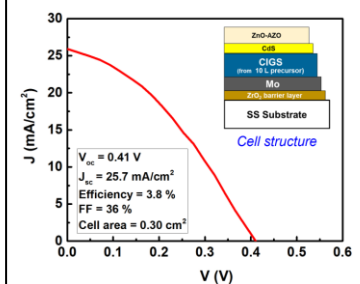
- Portable chargers for consumer electronics
- Mobility systems such as mini-drones and UAVs
- Standalone off-grid lighting solutions
- Building integrated PV

Technology Readiness Level (TRL)

- Established baseline processes to fabricate CIGS cells on SS foils
- Working lab-scale devices made and I-V performance evaluated



Flexible lab-scale CIGS solar cells made on SS foil



J-V characteristics

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										

*IPDI : Intellectual Property Development Indices

Major Patents/Publications

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