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

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Low to medium temperature stable non-chrome based solar absorber coatings on Stainless steel and copper substrates by cost-effective electrodeposition route for concentrated solar thermal power (CSP) application

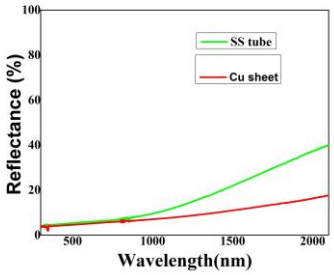
Overview

Solar collectors are very important devices for increasing energy efficiency in concentrated solar thermal power (CSP) for various industrial applications. Low to medium temperature stable solar absorber coating plays an important role in industrial process heat, desalination and solar hot water applications . For such application, coatings on large area and generation of solar receiver tubes are required by an economic way is one main objective to reduce the cost of power generation from solar energy. The technology involves an economical, efficient and environmental friendly non-chrome based absorber coatings by electrodeposition route

Key Features

- Cost effective and environmental friendly non-chrome based electrodeposition route
- High optical properties (solar absorptance: 94-95 % and thermal emittance: <0.20 (at 300°C)
- Temperature of operation: <300°C
- Good mechanical and weather stability

Image of non-chrome based absorber coating on SS tube and copper foil



Potential Applications

- Stream generation for various industrial applications
- Solar water heater
- Solar desalination
- Solar dryer

Technology Readiness Level (TRL)

- Performance and stability are validated at laboratory scale
- Scale up of electrodeposited coating development are completed

	ABSORPTANCE %	EMITTANCE %
SS Tube	94.7	19
Copper foil	93.8	12.7

IPDI*	1	2	3	4	5	6	7	8	9	10
Activities	*Basic concepts and understanding ofunderlying 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

1. Indian patent to be filed

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