



Cost-efficient Solar Receiver Tube Technology for Low & Medium Temperature Solar Thermal Applications

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Objective:

Indian industrial sector needs both power and thermal energy for their manufacturing processes. For the past few years, Indian industries are showing interest in exploring renewable energies, especially solar energy, due to their economic and environmental-friendly advantages.

In this regard, Centre for Solar Energy Materials, ARCI has developed a cost-effective selective coating to convert solar radiation into a heat which can be used for low and medium temperature industrial process heat applications. We followed a facile wet chemical route using a combination of novel chemical oxidation, sol-gel and nanoparticle coating methods.

Key Features:

- ✚ Cost effective and environmental friendly non-chrome based electrodeposition route
- ✚ High selective properties (solar absorptance ~95%; spectral emittance ~0.12-0.14)
- ✚ Low heat loss property: ~0.14 at 250 °C
- ✚ Temperature stability upto 250 °C
- ✚ High corrosion resistance > 200 hrs withstand in salt spray test (ASTM B117)
- ✚ High mechanical stability

Applications:

- ✚ Solar hot water & sea water desalination
- ✚ Solar drying and cooking
- ✚ Swimming pool heating
- ✚ Industrial process heat applications
- ✚ Power generation

Patents:

- ✚ Filed an Indian patent application no. 2142/DEL/2015 on 15/07/2015



Solar Receiver Tubes (1 meter)



Parabolic Trough Applications



Solar Cooking



Solar Hot Water Applications



Solar Receiver Tube (4 meters)

Technology Status:

- ✚ Technology has been transferred to GreenEra Energy India Pvt. Ltd on non-exclusive basis
- ✚ The technology is ready for transfer

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										