

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

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



High performance silicon carbide (SiC) tubes

Overview

SiC tubes have emerged as potential candidate material in the area of concentrated solar power generation, heat exchangers for recovery of heat from industrial waste, fuel cladding in nuclear reactors because of superior thermo-mechanical properties, high thermal conductivity, resistance to chemical attack and nuclear radiation. ARCI has developed the process for producing SiC tube by extrusion as well as cold iso-static pressing technique followed by sintering.

Key Features

- Extrusion press is capable of producing long tubes of different diameter and wall thickness.
- High production rate.
- Process flexibility to produce dense and porous SiC tubes.



Extrusion of SiC tubes

Potential Applications

- Tubular solar receiver in CSP technology.
- Heat exchanger.
- Nuclear fuel cladding tubes.
- Support tubes in membrane separation.



700 mm long sintered SiC tubes

Technology Readiness Level

- SiC tubes produced by both extrusion and cold-isostatic pressing have been produced and properties tubes are being evaluated.

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										

Major Publications

1. S. Mubina, A. K. Khanra and B. P. Saha, Processing of sintered and CVD coated SiC/CNFs thin composite tubes, *Mater. Chem. Phys.*, 220 (2018), 225-232.

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