



Ultra-Thin Hollow Ceramic Fibres Production

A method for producing stand-alone ultra-thin hollow ceramic fibres using sacrificial templates

Institution



CEITEC, Brno University of Technology

Development Status

Laboratory-validated, proof-of-concept successfully demonstrated (TRL 4–5).

IP Protection Status

Know-how is protected as proprietary expertise.

Partnering Strategy

Available for industrial collaboration, material development projects, and potential licensing.

The Problem

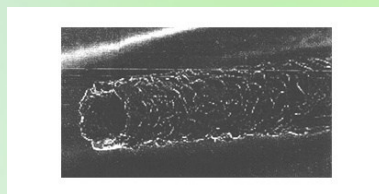
Conventional methods for fabricating hollow ceramic fibres (CVD, melt processing, sol–gel, or fibre drawing) are limited by cost, complexity, or achievable wall thickness. Existing techniques often require complex preforms or lead to structural defects during pyrolysis. The industry lacks a simple, scalable, and low-cost route for producing ultrathin hollow ceramic fibres with high mechanical stability.

Technology Description

The technology introduces a method to fabricate freestanding hollow ceramic fibres by coating a carbon-based sacrificial fibre template with sinterable ceramic particles (e.g., TiO_2 or hydroxyapatite). The coated template is dried, pyrolyzed to completely remove the carbon core, and sintered to form a dense, porous, or network-type ceramic wall structure.

Typical results:

- Outer diameter: 1–100 μm ;
- Wall thickness: 0.05–50 μm ;
- Fibre length: below 1 m in discontinuous mode;



Commercial Opportunity

Potential applications include:

- High-efficiency heat exchangers;
- Filtration and separation membranes;
- Bioactive scaffolds for tissue engineering;
- Catalytic and sensing components;
- Reinforcement in composite materials.

The process offers a cost-effective and scalable route to advanced ceramic microstructures, appealing to manufacturers and R&D partners in materials, biomedical, and energy industries.