

Project idea/ Field of expertise:

Development of high temperature materials and components (CMC, ceramics, metal-ceramic composites)

Organisation Name:

Fraunhofer Institute ISC,
Center for High-Temperature Materials and Design **HTL**

Adressed challenge(s)/ PPP(s):

- Components for extreme conditions
- Increase of plant efficiency
- High-energy performance processes

Adressed topic(s) in Work Programme:

LC-SPIRE-08-2020: Novel high performance materials and components (RIA)



ISC / Center HTL

- Non-profit research center, application-oriented research
- Expertise and skills:
 - Analysis, simulation and optimization (energy efficiency) of industrial high temperature processes
 - Development of (in-situ) measuring equipment and sensors for high-temperature material properties
 - Design and manufacturing of high temperature materials (ceramics incl. fibers and CMC, metal-ceramic composites)
 - special skills for materials design: microstructure-property simulation; additive manufacturing; textile technologies
- EU-funded projects: currently part of “FUDIPO” (SPIRE), www.fudipo.eu 10/16 - 09/20



Our project idea

Reinforcement of steel pipes with O-CMC jackets

Problem:

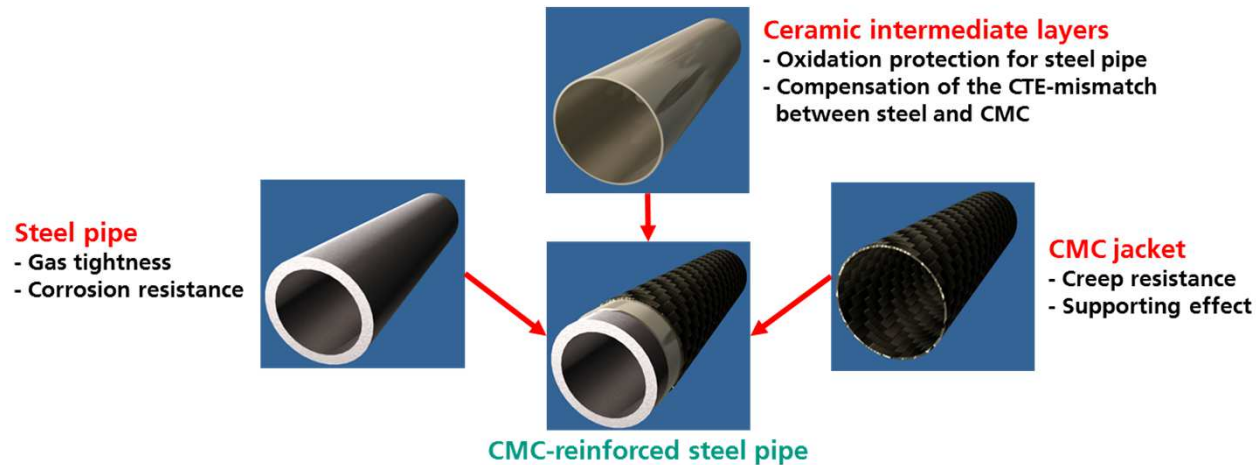
Limited life time of steam pipes due to tertiary creep
($T_i = 500 - 600 \text{ }^\circ\text{C}$, $p_i = 250 \text{ bar}$)



Solution concept:

Blocking of creep deformation by CMC jacket

⇒ Separation of functions using hybrid constructions



⇒ Prove of concept ✓

→ Life time 5x of an reinforced liner (laboratory scale, $600 \text{ }^\circ\text{C}$, 350 bar)

⇒ Reinforcement of a pipe section in power plant Grosskraftwerk Mannheim ✓

→ Testing phase in normal operation (planned term 5.000 h)

Consortium

Known partners

Name	Type	Country	Role in the project
Fraunhofer HTL	R&D	Germany	Research partner for CMC-materials and technology
MPA Stuttgart	R&D	Germany	Research partner for calculation and simulation

Partner search

Profile	Type	Country	Role in the project
Pipework constructor	Industry	tbd	Application of CMC-reinforcement to metal pipework / components
Plant constructor	Industry	tbd	Process-integration of CMC-reinforced pipework / components
End users	Industry	tbd	Test of CMC-reinforced components
University or institute	R&D / University	tbd	Research partner and coordinator

Contact details

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