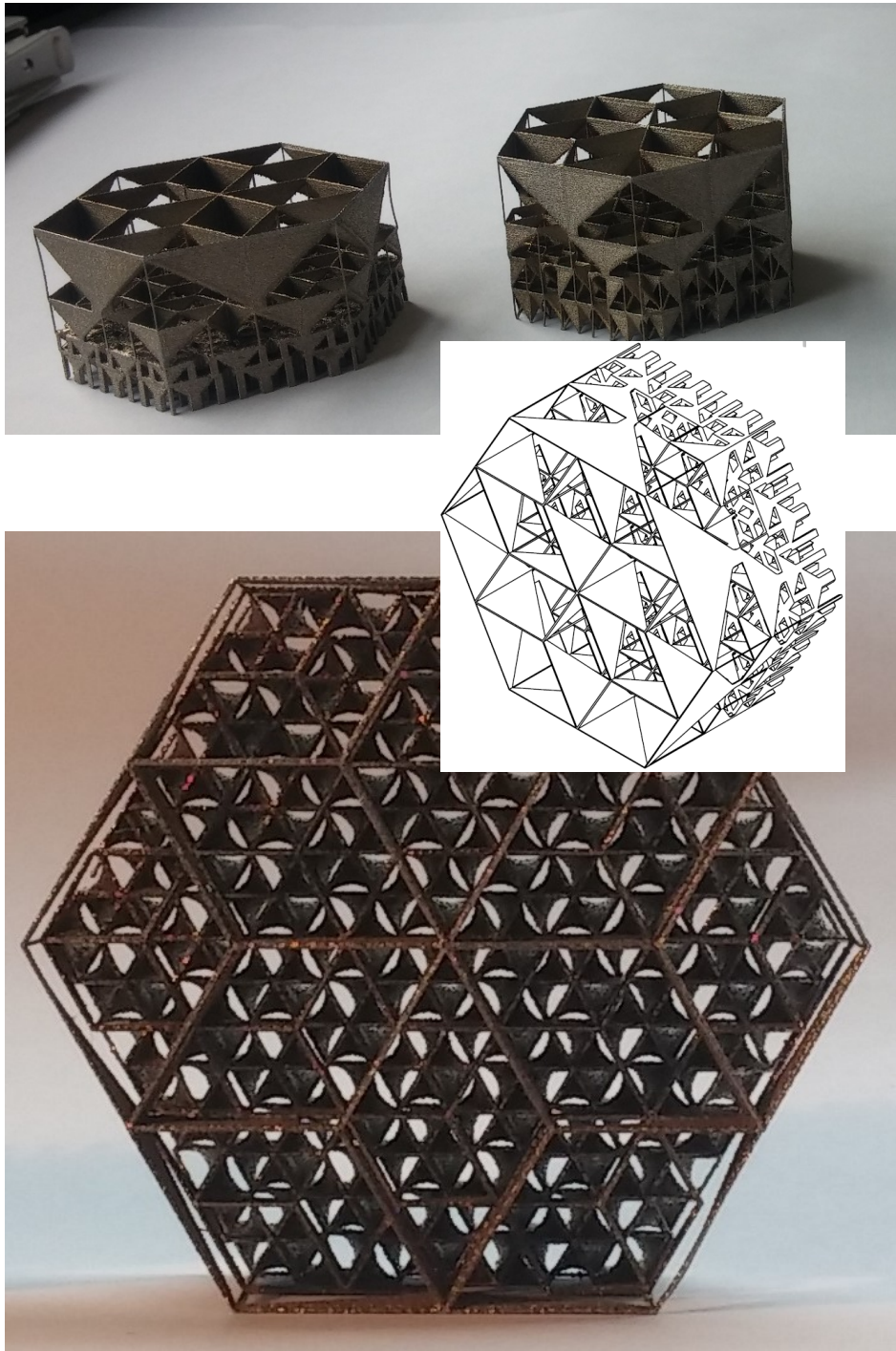


Volumetric Solar Receiver



Design and small scale prototype manufactured and tested by FBK at high flux conditions (10^6 W/m^2) high temperatures (800 °C) and cycled during a 2 week period.

Design of third generation solution, with validated volumetric effect

RIFERIMENTI E LINK

Reference person: Luigi Crema

Tel. 0461 314922

E-mail: crema@fbk.eu

Research Unit ARES: ares.fbk.eu

Research Center CMM: cmm.fbk.eu

DESCRIPTION

Invention and proof-of-concept of an innovative concept for improved radiation-to-fluid heat exchangers and volumetric receivers, based on a repetitive fractal structure at variable porosity layer-by-layer. The new geometry expands the design capability of high-performance receivers, thanks to the unprecedented set of parameters which can be tuned for the specific application.

SPECIFICATIONS

- Efficiency radiation-to-thermal: +20% respect state of the art;
- Customizable power radiation adsorption profile;
- Demonstration of Fractal Structure, Connected Fluid channels, Controlled solid Heat Transfer along Main Axis;
- Mixing Fluid channels for: Enhanced Turbulence, Improved, Convective Heat Transfer Coefficient, Transversal Fluid Mixing, Hot Spot avoidance.

ADVANTAGES & APPLICATIONS

- Open Brighton Power Cycles with air at high temperature as a source (1000 °C), e.g. central receiving towers;
- Advanced thermochemical reactors;
- Pressurized receivers working with liquid and gas fluid;
- Boilers and gas fired systems;
- Solar to fuels and solar to hydrogen.

STATUS

- TRL 4 - technology validated in lab.
- Patented technology: Patent and ownership submitted in 2015 by FBK: "RICEVITORE VOLUMETRICO A GEOMETRIA FRATTALE», under the topic «Invenzione Industriale».