

Carbonized Microvascular Composites for Gas Receivers (08736)

Carbon-based Receiver Systems are a Potential Alternative to Metal-Based Receiver Systems.

Impact

Receiver system can have one of the largest impacts on the performance and cost of a CSP system. How do we translate microvascular composite processing technology to manufacture carbon-based receiver systems?

Project Goal

Develop processing approaches for carbon-carbon composites with microvascular networks.

Create modeling tools to guide design and predict performance.

Understand the cost of these systems.

Method(s)

Develop computational tools and experimental test stands to predict and validate thermal, mechanical, and flow performance of the system.

Adapt processing methods for commercial carbon-carbon composite to fabricate a demonstrator system.

Outcome(s)

Initial material systems have been carbonized and graphitized as shown in the figure below. We are currently densifying these initial systems for testing. Both optimization and cost evaluation models have been constructed to guide system design.

Conclusion/Risks

Initial demonstration system is nearing completion and we have developed novel densification approaches using chemical vapor deposition and the microvascular network.

Team

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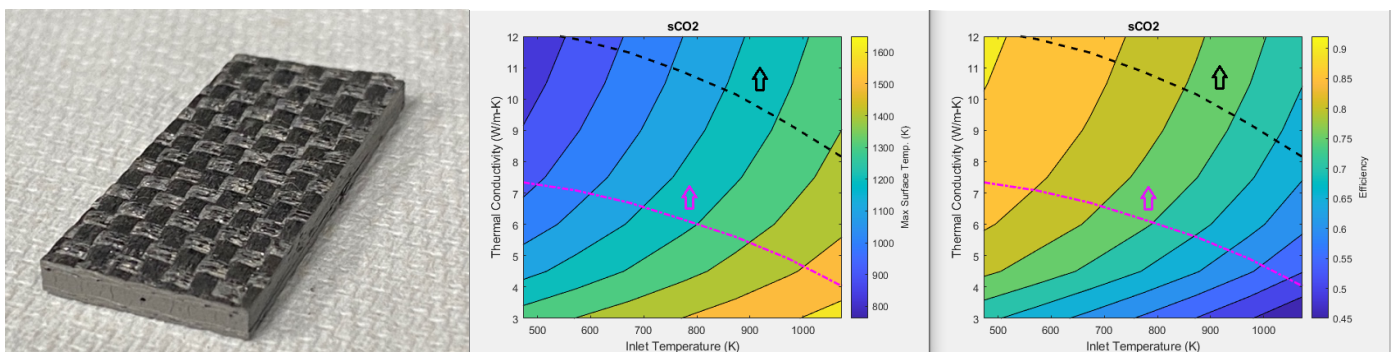


Figure 1. Image of a graphitized demonstration system (far left) and the design space for a sCO₂ receiver system demonstrating thermal efficiency above 85%

