

FSWR Microlith Performance Metrics Assessment

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Abstract

COMSOL Multiphysics® has been used to develop assessment tools for the NASA-sponsored Precision Combustion, Inc. (PCI) regenerable Microlith®- based adsorber modules. The Full Scale Water Removal (FSWR) PCI Microlith® was initially modeled for comparison with exit velocity data, measured while exterior canister was removed. Measurement data as well as flow analysis showed that the velocity magnitudes had noticeably high edges effects as depicted in Figure 1. Modeling then showed that significant damping of peak edge velocities could be accomplished with better structured insulation, as depicted in Figure 2. Measurement data after replacement of the matted insulation at top and bottom of the sorbent bed with Durablanket S insulation confirmed that the exit velocities averaged approximately 11.8 feet/minute and had significantly lessened edge effects. The FSWR model continues to be improved with additional COMSOL modules to further assess performance parameters.

Reference

1. Perry, J., Howard, D.F., Knox, J.C. and Junaedi, C. Engineered Structured Sorbents for the Adsorption of Carbon Dioxide and Water Vapor from Manned Spacecraft Atmospheres: Applications and Testing 2008/2009. International Conference on Environmental Systems (SAE, Savannah, GA, 2009).

Figures used in the abstract

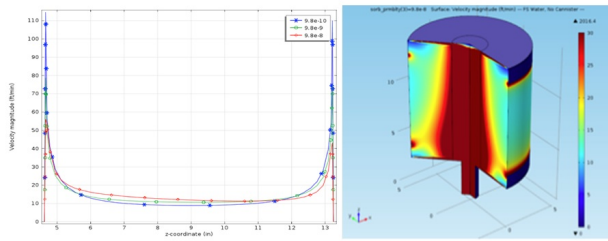


Figure 1: Initial exit Velocities of FSWR Microlith.

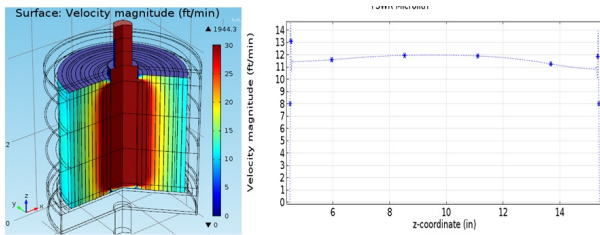


Figure 2: Velocities of FSWR Microlith after Insulation Replacement.