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Experimental and Numerical Investigation of Supercritical Carbon dioxide compact heat exchanger ROMA FATIMA, Department of Mechanical Engineering, Texas A&M University, ALAN KURIZENGA, MARK ANDERSON, University of Wisconsin-Madison, DEVESH RANJAN, Department of Mechanical Engineering, Texas A&M University — The use of super-critical carbon dioxide is gaining importance because of its use in Brayton cycles, to increase the cycle efficiency and reduce the initial capital investment, for high temperature energy conversion system. In order to reduce the capital cost, one improvement which was thought, is the use of compact, highly efficient, diffusion bonded heat exchangers for the regenerators. In this presentation we will focus on the experimental measurements of heat transfer and pressure drop characteristics within mini-channels. Two test section channel geometries were studied: a straight channel and a zigzag channel. Both configurations are 0.5m in length and constructed out of 316 stainless steel with a series of nine parallel 1.9mm semi-circular channels. The zigzag configuration has an angle of 115 degrees with an effective length of $\sim$0.58m. Heat transfer measurements were conducted for varying ranges of inlet temperatures, pressures, and mass flow rates. Numerical simulations have been performed using Fluent 12.0 to complement our experimental program. This is an ongoing program and we will be showing our recent progress we have made in last six months.

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