

Hybrid Ceramic/Metallic Recuperator for SOFC Generators

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A key component of an SOFC generator is the heat exchanger, or recuperator, which preheats the incoming cathode air using available heat in the exhaust stream. Especially for small scale natural gas and propane generators <10 kW, which Acumentrics has been concentrating its efforts, the recuperator must have a high effectiveness and be relatively low in cost. While the use of full metallic recuperators requires expensive high-alloy metals for oxidation resistance due to the high exhaust and air preheat temperatures, the operating temperatures are well within the capabilities of lower cost ceramic and refractory materials. The goal of this project is the development of a "hybrid" recuperator which utilizes ceramic and metallic materials to achieve the recuperator design goals of high effectiveness, low pressure drop, low cost and compact size. This poster presentation will present the latest design details of the recuperator as applied to a residential micro-CHP (combined heat and power) SOFC generator. It will also present the test results for the individual heat exchanger sections as well as the integrated system.