



Materials and Systems Research, Inc.

Fuel Cell Technology

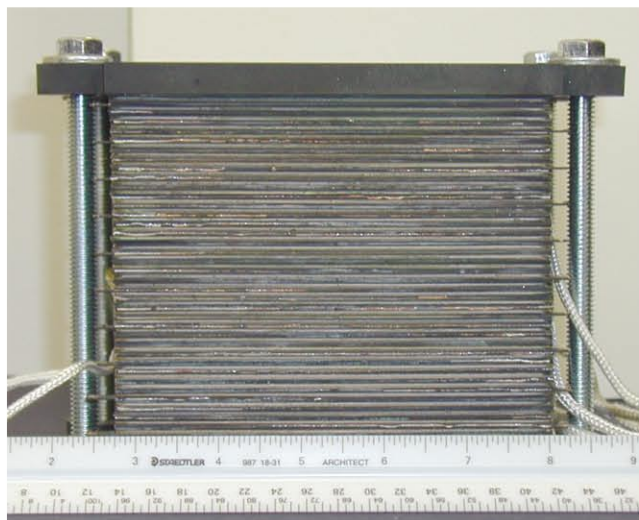
Fuel cells convert the chemical energy of gaseous fuels such as natural gas, coal-based syngas, methanol, or hydrogen directly into electricity at very high efficiency. In a fuel cell, an oxidation-reduction reaction takes place across an electrolyte in which air and a fuel combine to produce water, CO₂, heat, and electric current. As long as the fuel cell has a source of hydrogen or carbon monoxide and oxygen, it will continue to produce an electric current.

MSRI uses thin metallic interconnects and pressure sealing gaskets to build solid oxide fuel cell (SOFC) stacks, allowing the cells to freely expand and contract during thermal excursions without transmitting stresses to adjacent cells. This provides excellent thermal shock resistance by allowing rapid heating and cooling of the stacks. This design also allows flexibility in refurbishing stacks and lends itself to high volume-specific power output (estimated to be as high as 1.8 kW/liter).

MSRI's single planar cells deliver power densities of 1.9W/cm² and stacks produce 0.6 W/cm², among the highest values reported for SOFCs anywhere in the world.

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MSRI has also developed proprietary tubular technology built around porous SOFC tubes. The SOFC tubes can be manufactured in different lengths and diameters allowing for flexibility in bundle development and design. MSRI has demonstrated tube bundles containing multiple tubes and various methods of current collection. Currently MSRI is in the process of demonstrating a tubular bundle that generates 250 W.

