# FABRICATION AND OPERATION OF FLAT TUBULAR SEGMENTED-IN-SERIES(SIS) SOLID OXIDE FUEL CELLS (SOFC)

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Abstract

A flat tubular segmented-in-series(SIS) SOFC sub module for intermediate temperature (600 – 800 $^{o}$C) operation was fabricated and operated in this study. For this purpose, we fabricated flat tubular ceramic supports through an extrusion process and analyzed the basic properties of the ceramic support, such as visible microstructure, porosity, and mechanical strength, gas permeability, respectively. After that, we fabricated a flat tubular SIS SOFC single cell by using screen printing and vacuum slurry coating method in the case of electrode and electrolyte, and obtained the performance of 0.495W/cm$^2$ at 750 $^{o}$C. To make a sub module for flat tubular SIS SOFC, 5 flat tubular SIS SOFC single cells with an effective electrode area of 0.8 cm$^2$ were coated onto the surface of the prepared ceramic support and were connected in series by using Ag+glass interconnect between each single cell. The performance of the 5-cell sub module for flat tubular SIS SOFC in 3 % humidified $H_2$ and air at 800 $^{o}$C showed a maximum power of 2.5 W.

Keywords: segmented-in-series (SIS), ceramic support, flat tubular SOFC, unit bundle