

FABRICATION AND PERFORMANCE OF TUBULAR  
DIRECT CARBON FUEL CELL BASED ON THE  
GENERAL ANODE SUPPORT SOLID OXIDE FUEL

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Abstract

A tubular direct carbon fuel cell based on general anode supported solid oxide fuel cells(SOFC) was fabricated and operated in this study. For this purpose, we fabricated anode supports through an extrusion process and essential components such as electrolyte and electrode were coated on the surface of anode support consecutively by using the vacuum slurry and the dip coating method. Carbon black and molten carbonate as a fuel and an electrochemical mediator were filled in the inner part of the tubular DCFC cell. The performance of tubular DCFC cell in carbon + molten carbonate(1:1 wt.%) and air at 800 °C showed a maximum power density of 124 mW/cm<sup>2</sup> and it was operated with variable operation conditions such as operating temperature, operating time, thermal cycling and so on. These results indicate that the fabricated tubular DCFC can be a promising power generation system for many other practical applications, such as RPG, APU systems, and so on.

Keywords:

Tubular DCFC, SOFC, carbon, operation