

Operation Characteristics of Tubular Direct Carbon Fuel Cell based on the general Anode Support Solid Oxide Fuel Cell

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A tubular direct carbon fuel cell based on general anode support 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 900 oC showed a maximum power density of 124 mW/cm² and it was operated with variable operation conditions such as operating temperature, anode inert gas flow, an addition of CO₂ gas at anode side and so on. These results indicate that the fabricated tubular DCFC can be a promising candidate for a power generation system for many other practical applications, such as RPG, APU systems, and so on.