

DC-MCFC performance improvement by using Nickel support

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The direct carbon fuel cell is a special type of high temperature fuel cell that directly uses solid carbon as anode and fuel. In this study, Molten carbonate fuel cell (MCFC) used hydrogen as fuel, however, it was replaced with carbon as fuel for Direct carbon fuel cell(DCFC). Direct carbon combined with molten carbonate fuel cell is called, Direct carbon - molten carbonate fuel cell(DC-MCFC). Graphite was used among several carbon fuels, and also Nickel catalyst was used among several catalysts. The powder density of DC-MCFCs measured at different temperatures(600~850), As a result, we obtained a good result at 800oC(46.65mW/cm²). The purposes of this study are to increase the emissions of CO gas in the inner and get good performances at 700°C in stead of 800°C. Nickel catalyst affects the performance we used various types of nicked supported(mesh, foam, fiber). As a result, we speculate Ni-fiber and Ni-foam supported carbon monoxide emit much higher than Ni-mesh supported due to the high active area of the catalyst. Ni-fiber supported has obtained the maximum power density 31.6mW/cm².