

Low Cost Preparation of Ni-5wt%Al alloy Anode at Reduced Temperature for Molten Carbonate Fuel Cells

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The preparation method used in this study is the synthesis process of Ni-5wt% Al alloy anode from the green sheet consisted of a physical mixture of 95wt% Ni and 5wt% Al elemental powders by feeding AlCl_3 vapor into a reactor. The first step is to remove the organics of the green sheet (sintering process), and then AlCl_3 vapor is introduced into a reactor for the formation of Ni-5wt% Al alloy (alloying process). Namely, the two-step process (the preparation of Ni-Al alloy powders and the sintering process) are combined into the one-step preparation. In addition, the alloy formation is performed under the melting point of Al (below 660°C). So, the price for alloy formation can be reduced due to the inexpensive Ni and Al elemental powders, the low reaction temperature, the combined process and the low price of AlCl_3 . In this study, we have prepared Ni-5wt% Al alloys anode from the green sheet consisted of a physical mixture of Ni and Al elemental powders by using AlCl_3 at reduced temperatures. Physical properties of Ni-5wt% Al alloy anode were examined by three point bending strength test and mercury porosimetry. Creep resistance was also investigated.