

Electrochemical internal reforming of Carbon dioxide by Methane in SOFC System

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The CO₂ catalytic reforming by CH₄ is an attractive conversion technology because of the possibility of enhancing natural gas utilization with the sequestration of CO₂. However this reaction has two serious problems such as the high energy consuming process and catalyst deactivation. To improve these problems, the electrocatalytic reforming of CO₂ with CH₄ was carried out in the SOFC system using electrochemical cells. Ni-YSZ-ceria based anode materials were prepared by precipitation method or physical mixing, and the electrochemical cells were manufactured by a tape casting method. The catalysts before and after the reaction were characterized by XRD, N₂ Physisorption, SEM and TPD. It was found that Ni_{0.6}YSZ_{0.4}CeO₂ | YSZ | (LaSr)MnO₃ cell showed higher conversion than the other electrocatalytic cells under tested conditions.