Effects of steam and oxygen addition on activity and stability of Ni fiber and ceria coated Ni fiber catalysts towards CO_2 reforming of CH_4

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Biogas(mostly CH_4 and CO_2) has emerged as a renewable, low cost source of hydrogen. Therefore there are lots of attempt to successfully utilize this feedstock for energy conversion in high-temperature fuel cells. It is well known that nickel-based catalysts show good activity in CO_2 reforming of methane but are also easily deactivated by carbon deposition. This presentation will describe the catalytic behavior of nickel fiber felt, which is considered as a potential structured catalyst for direct internal reforming molten carbonate fuel cells using biogas as fuel. Ceria coating and the addition of oxygen and steam helped reduce effect of coke deposition, improve activity and stability of catalysts. The effects of the reaction temperature (600°C-700°C), H2O/C ratios (02-coated Ni fiber. CeO_2 was introduced to the surface of nickel fiber by sol-gel dip coating method. The used catalysts were structurally characterized using conventional methods such as SEM, XRD and XPS.