Highly KOH Resistant Ni-MgO-Al_2O_3 Catalyst for Direct Internal Reforming (DIR) in MCFC

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Nano-sized MgO-Al_2O_3 supported Ni catalysts have been designed for direct internal reforming (DIR) in MCFC. Ni-MgO-Al_2O_3 catalysts (Ni content > 50wt%) have been prepared by the co-precipitation method to finely disperse Ni crystallites on the support. NiO crystallite size has been found to be 2 ~ 4 nm, indicating nano-dispersion of NiO. The prepared Ni-MgO-Al_2O_3 catalysts have been poisoned by an appropriate amount of KOH and applied for steam reforming reaction at the same temperature and S/C ratio of MCFC (T = 650°C, H_2O/CH_4 = 3.0). According to the reaction results, Ni-MgO-Al_2O_3 with 10% MgO exhibits the highest KOH resistance among the catalysts tested in this study.