

### Development of Tri-reforming catalyst for SOFC and MCFC Fuel Reformer Applications

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The tri-reforming of  $\text{CH}_4$  as a  $\text{CO}_2$  conversion technology was investigated over Ni based catalysts to investigate the feasibility for application in fuel reformer of SOFC and MCFC systems. The catalysts were prepared by physical mixing and impregnation methods and the tri-reforming reaction was carried out at a temperature range of 650 to 850 °C and feed molar ratio of  $\text{CH}_4 / \text{CO}_2 / \text{H}_2\text{O} / \text{O}_2 = 1 / 1 / 1 / 0.1$  in a fixed bed reactor system. The oxidants like oxygen and steam do a important role in tri-reforming reaction. The conversions of both reactants were almost 100% over  $\text{CeO}_2$  and  $\text{MgO}$  contained catalysts at 800 °C. The concentration of  $\text{H}_2$  and  $\text{CO}$  was stabilized after undergoing for 3 h, and was obtained 52.9% and 47.1%. The tri-reforming of  $\text{CH}_4$  as the reduction and sequestration technology of  $\text{CO}_2$  was preformed to apply in a fuel processor of SOFC and MCFC systems.