Experiments and Simulations for the Steam Reforming of Methane over Ni-based Catalyst

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Methane steam reforming (MSR) is a major route for the industrial production of H_2. In this work, steam reforming of methane over Ni-based catalyst was carried out for applications in fuel processor system. The Ni-based catalyst was prepared by co-precipitation and dipping methods and characterized by N_2 physisorption, CO-chemisorption, XRD, SEM, TEM and TPR. The product gas compositions for MSR were calculated thermodynamically as a function of temperature based on the principle of Gibb's free energy minimization. The steam reforming of methane in a catalytic reactor has been simulated by computational fluid dynamics (CFD).