

307f Effect of pH on Morphology of Y₂O₃ Nanoparticles and on Their Performance as Supports for Ni-Based Ethanol Reforming Catalysts

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Abstract: Micro-structured and nano-structured yttrium oxides in tunable shape have been successfully synthesized using simple hydrothermal synthesis method. Experimental results reveal that the morphology (such as nanorod-like or sheet-like structure) of the resultant yttrium oxide particles is sensitive to the pH value of the mother liquor and the precipitating agent. Interestingly, the morphology of yttrium oxide affects its performance as a catalyst support of Ni-based catalysts for ethanol oxidative steam reforming (EOSR) to produce hydrogen. Ni supported on nanorod-like yttrium oxide has superior activity than that supported on sheet-like yttrium oxide and this superior activity could be attributed to the larger surface area of nanorod-like yttrium oxide. All these results show that the morphology of yttrium oxide, which can be systematically controlled during synthesis, can influence the activity and selectivity of yttrium oxide supported Ni catalysts for oxidative steam reforming of ethanol to hydrogen.