Study on nanoscale size effects of Cu nanoparticles/ZnO nanowire catalysts for methanol steam reforming process

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Cu/ZnO based catalysts have been commonly used to achieve for hydrogen production from methanol steam reforming under relatively low temperature. To date, there have been many reports to elucidate surface reaction mechanisms for better catalytic performance. According to these studies so far, it has been known that the Cu size control in the Cu/ZnO bulk catalysts is one of the main issues related to the active sites which results in high performance. The advanced methods to disperse copper and control effectively the size of the copper have been investigated as adding another metals or varying the process condition of precipitation or calcination. In our previous works, it was already revealed that Cu nanoparticles on the non-polar facet of ZnO nanowire can act as effective active sites for the methanol steam reforming processes. In this work, the Cu particle size effect on non-polar facet of ZnO nanowire was investigated in detail in terms of reforming performance. It will be demonstrated that the optimal size of Cu nanoparticle on ZnO nanowire can lead to the enhancement of catalytic performance.