

Cu/Zn/Al Xerogels and Aerogels Prepared by a Sol–Gel Reaction as Catalysts for Methanol Synthesis

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ZnO/Al₂O₃, CuO/Al₂O₃, and CuO/ZnO/Al₂O₃ xerogels and aerogels have been prepared by a sol–gel route using propylene oxide as gelation initiator. For aerogel preparation, the solvent was extracted with supercritical CO₂. Calcination of these xerogels and aerogels was followed by thermogravimetry (TG), and the microstructure of these calcined xerogels and aerogels was investigated by TEM, powder XRD, EXAFS, and nitrogen physisorption (BET, BJH). The oxide mixtures CuO/Al₂O₃ and CuO/ZnO/Al₂O₃ were also studied by temperature-programmed reduction (TPR), and their cata-

lytic activity in the formation of methanol from CO/CO₂/H₂ synthesis gas was measured. The aerogels have a higher specific surface area and a higher Cu surface area than the corresponding xerogels, which results in a higher catalytic activity for methanol synthesis. The presence of ZnO significantly increases the catalytic activities of both the xerogel and the aerogel.

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