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Investigation on binary copper-based catalysts used in the ethanol steam reforming process

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The use of copper-based binary catalysts, Cu/Zr oxides and Cu/Al oxides, has been examined to produce hydrogen from ethanol in the ethanol steam reforming process. The examined catalysts were compared with non-noble bicomponent catalysts consisting of oxides of nickel and cobalt: Ni/Zr Co/Zr, Ni/Al and Co/Al, prepared and tested in the identical way. Catalytic tests were carried out in the fixed-bed reactor in the temperature range 433–873 K for initial molar ratio of ethanol to water equal to 1:3. Ethanol conversion approached near 100%. Catalysts were characterized by XRD, TPR. Cu/Zr oxides. The catalyst showed very good selectivity. It is significant that carbon monoxide appeared only above 600 K and its selectivity has not exceeded 3% in the higher temperature range. No methane has been detected. Hydrogen yield was relatively stable in the temperature range from 513 to 873 K. Similarly, in the presence of Cu/Al oxides neither CO nor CH4 were found in the products. The correlation between activity of examined catalysts and textural properties was not found.

Metryczka

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