

# Nanocomposites and nanomaterials

## Zr-Y-Cu-O catalyst of dehydrogenative coupling features

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The Zr-Y-O functionalized materials character [1] towards the previous successful application of Zr-Mg-Y-O materials as active catalysts for esters, aldehydes or alcohols ketonization [2] and phenol alkylation [3] prompted us to attempts to exploit the Zr-Y-O materials to use in catalysis. The newly used materials are enriched with copper. Nanopowders (NPs) were synthesized by co-precipitation of chloride and nitrates salts of zirconium, yttrium and copper in ammonia with follow treatment of precipitate at 600 °C and pressure of 500 MPa. Nps are tetragonal crystal. As compared to the previously used Zr-Mg-Y-O, the newly prepared Zr-Y-O containing Cu material has significantly improved catalytic properties. When butan-1-ol transformations were used as the test reaction, both, the dehydrogenation of the primary alcohol and the consecutive bimolecular reactions of the already created aldehyde (n-butanal) to ester (butyl butanoate) and symmetric ketone (heptan-4-one) proceed with higher yields as a result of improved selectivities as well as conversion level. Dependence on the method of preparation were not very substantial. The crucial role regarding the catalytic properties refers to the proper selection of components. The great advantage of the investigated material is the relatively low content of copper (1 mol. %) when compared to the other catalysts of the composition Zr–Y–Cu–O [4].

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