

A catalyst study on methanol synthesis from direct methane conversion using a dielectric barrier discharge

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A series of metal catalysts were investigated for methanol and higher hydrocarbons production from direct methane conversion in a dielectric barrier discharge. The main goal of this study is to identify the metal catalyst components which can influence the reactions to increase the production of methanol in the room-temperature plasma condition. Among the catalysts tested, Cu/ZnO/Al₂O₃ and YSZ show a unique result of catalytic reaction in a reactor bed packed with glass beads. Cu/ZnO/Al₂O₃ and YSZ increased the methanol selectivity by factor of 1.5 to 2. Moreover, by addition of 5% yttrium over Cu/ZnO/Al₂O₃, the selectivity of methanol was higher 2.5 times than non catalytic reaction.