ABSTRACT

CO_2 is one of the greenhouse gas that mainly contribute to the major environmental issues such as global warming, acid rain and ocean acidification. Various method have been developed to alleviate the effects of the increased atmospheric concentration concentration of CO_2 such as storage utilization and capture. Among all the developed methods, the transformation of CO_2 to valuable chemicals is one of the promising methods to control its atmospheric concentration and impact on our environment. The conversion of CO_2 to chemicals can be done through thermochemical, biochemicals, electrochemical, photochemical and chemical fixation of CO_2 , to commercialize these processes, highly efficient catalysts are required.

In our work, we synthesized the Trimetallic CuO-ZnO-Al_2O_3 nanoparticles as a catalyst for CO_2 conversion to methanol. The Trimetallic CuO-ZnO-Al_2O_3 nanoparticles were synthesized as the second and third metal influences the electronic properties of the other metal and thus improves the catalytic efficiency of the conversion. The synthesized catalysts include CuO-ZnO-Al_2O_3 , CuO-ZrO-Fe_2O_3 nanoparticles. All of these nanoparticles were synthesized by hydrothermal method as hydrothermal method is famous for the synthesis of the porous catalysts. The fabricated nanoparticles were then characterization by UV-Visible, SEM and XRD. SEM images revealed that all synthesized catalysts have porous morphology.

The synthesized Trimetallic CuO-ZnO-Al_2O_3 nanoparticles were found to be efficient, cost effective and environment friendly catalysts for the conversion of CO_2 to methanol. These catalyst can be further applied on large scale.