Direct conversion of CO_2 to methanol over $ZnO-ZrO_2$ bimetal catalyst synthesized with different methods

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Bifunctional catalysis coupling CO_2 to methanol and methanol to hydrocarbons is a promising strategy for the direct hydrogenation of CO_2 into aromatics. However, selective conversion of CO_2 and H_2 into aromatics is still challenging due to the high unsaturation degree and complex structures of aromatics. Though, there is still lack of efficient catalysts to convert CO_2 to methanol with high activity and high methanol selectivity at high temperature above 300°C. The synergistic interaction between two components in bimetal catalysts is one of the crucial factor in determining catalytic performance. Herein, we report the $ZnO-ZrO_2$ bimetal catalysts synthesized with different methods to highlight the interactions between the two components in controlling the catalytic performance of catalysts. Furthermore, a tandem catalyst comprising of $ZnO-ZrO_2$ and HZSM-5 used for one-pass conversion of CO_2 to aromatics.