

Cycloaddition of CO₂ to Styrene Oxide Using Double Metal Cyanide as an Efficient Catalyst

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Several double metal cyanide (DMC) catalysts based on Zn₃[Co(CN)₆]₂ were prepared. Here the introduction of cetyl trimethyl ammonium bromide (CTAB) as a complexing agent was employed. From the XRD data it is clear that all the catalysts were amorphous with no peak corresponding to ZnCl₂. All the DMC catalysts showed almost similar d-spacing values indicating that the structure has not much alteration while adding complexing agents. From the XPS analysis, the shift in binding energy of zinc atom from ZnCl₂ to DMC suggests a successful introduction of the complexing agent to DMC. Elemental analysis and FT-IR also confirmed the incorporation of complexing agents to Zn₃[Co(CN)₆]₂. DMC was proved to be an effective catalyst for the solventless synthesis of styrene carbonate by cycloaddition of styrene oxide and CO₂. The effect of reaction parameters like catalyst amount, temperature, CO₂ pressure and reaction time was also investigated.