

Copper-Decorated Core–Shell Structured Ordered Mesoporous Containing Cobalt Ferrite Nanoparticles as High-Performance Heterogeneous Catalyst toward Synthesis of Tetrazole

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The present work describes the synthesis of copper immobilization on $\text{CoFe}_2\text{O}_4/\text{MCM-41}$ as a catalyst, which is created by attaching copper and ligand (N-phenyl anthranilic acid (PA)) on the surface of $\text{CoFe}_2\text{O}_4/\text{MCM-41}$ ($\text{CoFe}_2\text{O}_4/\text{MCM-41}/\text{PA}/\text{Cu}$). The synthesized $\text{CoFe}_2\text{O}_4/\text{MCM-41}$ support and immobilized copper were identified by FTIR, TEM, VSM XRD, and nitrogen adsorption–desorption analysis. The results showed that MCM-41 silica was coated with magnetite nanoparticles and copper was successfully immobilized on this structure. The catalytic performance of synthesized catalyst was tested in the synthesis of tetrazole. It was shown that the solid catalyst exhibited a strong magnetic response and showed good catalytic activity in the synthesis of tetrazole. The catalytic test showed that copper supported on $\text{CoFe}_2\text{O}_4/\text{MCM-41}$ hybrid showed much better catalytic activity than copper supported on CoFe_2O_4 , indicating that MCM-41 plays an important role in $\text{CoFe}_2\text{O}_4/\text{MCM-41}$ hybrid for the synthesis of tetrazole. Separation of the solid catalyst from the reaction mixture was easily performed by external magnetism without apparent mass loss. And the catalyst could be reused six times for the synthesis of heterogeneous tetrazole [1-3].

Keywords: $\text{CoFe}_2\text{O}_4/\text{MCM-41}$, N-phenyl anthranilic acid (PA), Copper, Synthesis of tetrazole.

References

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