

ONE POT SYNTHESIS OF CoFe SILICA RICE HUSK CATALYST

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ABSTRACT

ONE POT SYNTHESIS OF CoFe SILICA RICE HUSK CATALYST

With the increasing demand for sustainable catalysts, this study investigates the use of rice husk ash (RHA), a silica-rich byproduct of rice production, to develop silica-supported catalysts. The problem of underutilizing agricultural waste for high-value products and the challenge of optimizing catalytic performance with different metal species are addressed. Monometallic cobalt (Co), monometallic iron (Fe), and bimetallic CoFe catalysts were synthesized using a one pot synthesis using sol-gel method at pH 7. Characterization using X-ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Energy-dispersive X-ray Spectroscopy (EDX), and Fourier-transform Infrared Spectroscopy (FT-IR) confirmed successful synthesis and metal incorporation. XRD identified CoFe alloy phases and amorphous silica, SEM and EDX revealed uniform metal dispersion, and FT-IR confirmed metal-silica bonding. The bimetallic CoFe catalyst showed superior catalytic performance compared to the monometallic variants, demonstrating the effectiveness of combining Co and Fe. This study highlights the potential of RHA as a sustainable silica source for catalysts and provides a foundation for further optimization in industrial applications.