

This paper investigates the role of transition metals as catalysts in hydrogenation reactions, focusing on the reactivity and efficiency of various metal catalysts. The study aims to understand the mechanistic pathways through which transition metals facilitate the addition of hydrogen to unsaturated organic compounds, such as alkenes and alkynes. By analyzing experimental data and computational models, this research seeks to identify key factors that influence catalytic activity, including electronic structure, coordination environment, and ligand effects. The findings are expected to contribute to the development of more efficient and selective catalytic processes in industrial and pharmaceutical applications.