Unleashing the Potential of Nickel-Catalyzed Cross-Coupling by Thermal Catalysis, Photocatalysis, Electrocatalysis, and Mechanochemistry

Shao-Chi Lee

Nickel-catalyzed cross-coupling reactions offer a transformative approach to sustainable chemical processes, leveraging the unique properties of nickel to facilitate efficient and selective transformations.

Recent advancements encompass a variety of catalytic systems, including thermal catalysis, photocatalysis, electrocatalysis, and mechanochemistry. Highlights include the development of novel nickel catalysts for reductive cross-coupling and desulfurization reactions, as well as their application in the synthesis of complex organic molecules.

Mechanistic studies provide deep insights into the catalytic cycles and pathways, supported by advanced techniques such as DFT calculations and photophysical measurements.

These innovations not only enhance reaction efficiency but also expand the scope of nickel-catalyzed processes, demonstrating significant potential for industrial and pharmaceutical applications.