

Exploring the Frontiers of Mechanochemistry: Innovative Strategies for Developing Efficient Organic Reactions

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Mechanochemical synthesis, which uses little to no solvent, is an alternative to conventional organic synthesis in solution. Instead of using a solvent and standard glassware, mechanochemical reactions are performed using a ball mill or other pulverizing device. In addition to the reduced use of organic solvents, this method offers several advantages, such as accelerated reactions due to high concentration conditions, the ability to react with unsolvable compounds, activation of substrates via physical forces, and increased selectivity in a solid phase. Taking advantage of these advantages, we have reported on the Suzuki coupling of insoluble compounds, performed "mechanoredox" reactions using piezoelectric materials, synthesized organometallic compounds such as "Grignard reagents through ball milling", and achieved "ultra-fast 1 min Birch reductions". This talk will present our latest research results on the potential of this technique and its impact on the field of organic synthesis.