



CMCC *Mechanochemistry Discussions*

Online Seminar Series

Mechanochemical Organic Synthesis: Revisiting Cross-Couplings, Grignard Reagents, and Redox Reactions

Livestreaming at
10:00 AM (CT)

THURS., February 17, 2022

on the CMCC YouTube Channel:

<https://www.youtube.com/channel/UC7eCYPKbGTKpgO7W2bNABxg>



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ABSTRACT:

The limited number of reactions tend to be used more frequently than others in the synthesis of organic compounds. It is expected that many organic chemists will make use of mechanochemical reactions in the future, and it would be useful to focus on the most important reactions. Suzuki-Miyaura and Hartwig-Buchwald couplings are extremely important reactions, which constitute 32% of the reactions used in the drug discovery. However, under mechanochemical conditions, catalyst deactivation and poor reactivity with solid substrates has been a problem. We found that addition of 1,5-COD and heating conditions dramatically improve the efficiency of these cross-coupling reactions. Grignard reaction is one of the fundamental and most widely used organic reactions developed by Victor Grignard 120 years ago. To conduct this reaction mechanochemically, we thoroughly investigated the reaction conditions and achieved almost the same reactivity as the Grignard reagent synthesized in solution under ball mill conditions. We also developed mechano-redox reactions that mimics the photoredox reaction, which has attracted much attention recently, using piezoelectric materials.



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