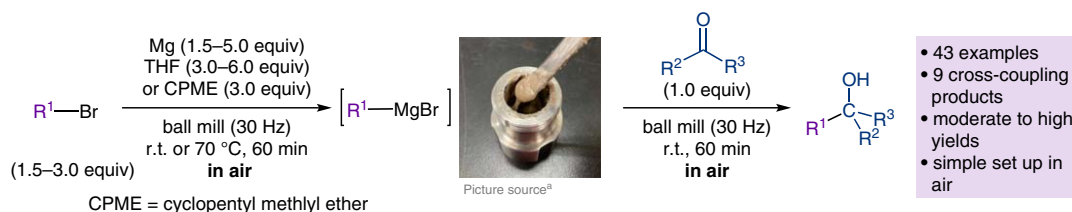


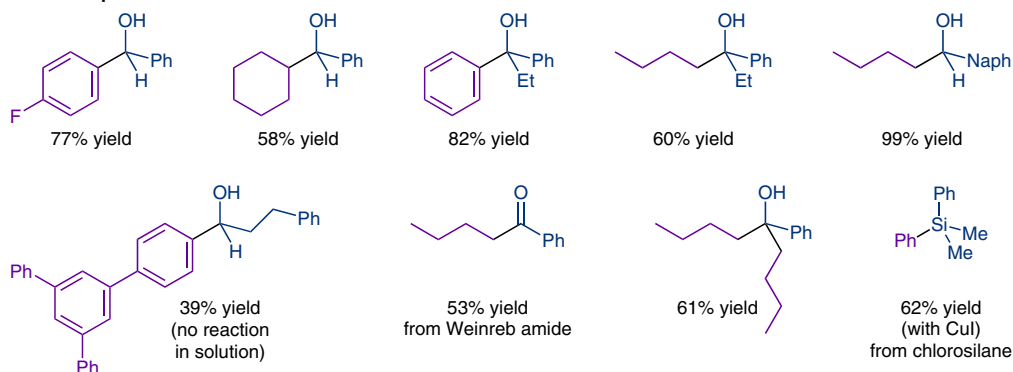
R. TAKAHASHI, A. HU, P. GAO, Y. GAO, Y. PANG, T. SEO, J. JIANG, S. MAEDA, H. TAKAYA, K. KUBOTA\*, H. ITO\* (HOKKAIDO UNIVERSITY, SAPPORO, JAPAN)  
 Mechanochemical Synthesis of Magnesium-Based Carbon Nucleophiles in Air and Their Use in Organic Synthesis  
*Nat. Commun.* **2021**, *12*, DOI: 10.1038/s41467-021-26962-w.

# Like a Rolling Stone! Mechanochemical Synthesis of Grignard Reagents in Air

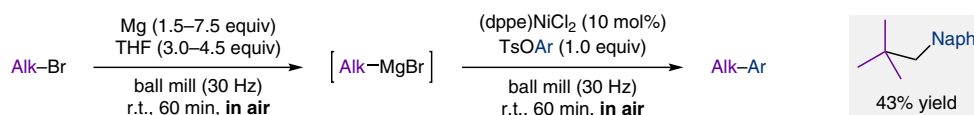


<sup>a</sup> R. Takahashi, A. Hu, P. Gao, V. Gao, V. Pang, T. Seo, J. Jiang, S. Maeda, H. Takaya, K. Kubota\*, H. Ito\* *Nat. Commun.* **2021**, *12*, 6691; DOI: 10.1038/s41467-021-26962-w (CC-BY).

## Selected examples:



## Kumada-Tamao-Corriu coupling:



**Significance:** A mechanochemical approach for the generation of Grignard reagents using a ball mill is presented. The solvent-free, in-air generation of these carbon nucleophiles and their nucleophilic addition to electrophiles opens a straightforward way to conduct a classic reaction. This method can also be applied to Kumada-Tamao-Corriu couplings and copper-catalyzed conjugate additions.

**Comment:** Addition of various mechanochemically prepared Grignard reagents to aldehydes or ketones gives the corresponding alcohols in good to excellent yield. Even solid arylbromides with low solubility can be transformed into the corresponding Grignard reagents where the classic approach fails. Only 3.0–6.0 equivalents of a coordinating ether solvent are required for the reaction to occur.

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 Synfacts 2022, 18(02), 0151 Published online: 18.01.2022  
 DOI: 10.1055/s-0041-1737790; Reg-No.: M04021SF

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Category

Metals in Synthesis

Key words

ball mill

carbon nucleophiles

Grignard reagents

mechanochemical synthesis

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