Resonant Acoustic Mixing (RAM): Fast, impact-less metal-catalysed mechanosynthesis

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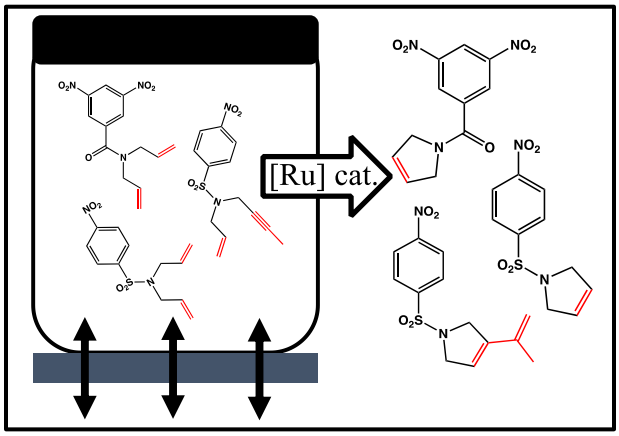

Mechanochemistry is an attractive and valuable methodology for synthetic and materials discovery, while being positioned to be the cornerstone of alternative, sustainable synthesis.[1,2] Current milling and extrusion systems rely on milling, grinding or crushing media to impart mixing and chemical reactivity, often resulting in material contamination through wear and tear.[3]

We herein report methodologies that promotes catalytic organic mechanosynthesis by Resonant Acoustic Mixing (RAM) – an emerging mechanochemical technology that does not require bulk solvent or milling media. Using as the model reactions ruthenium-catalyzed ring-closing metathesis, RAM mechanosynthesis is now shown to be faster, operationally simpler than conventional ball-milling, while also providing the first example of a mechanochemical strategy for ene-yne metathesis.[4]

[1] James *et al. Chem. Soc. Rev.* **2012**, *41*, 413; [2] Do, Friščić *ACS Cent. Sci.* **2017**, *3*, 13; [3] Friščić, Mottillo, Titi *Angew. Chem. Int. Ed.* **2020**, *59*, 1018; [4] Gonnet, L.; Lennox, C. B.; Do, J.-L.; Malvestiti, I.; Koenig, S. G.; Nagapudi, K.; Friščić, T. *Angew. Chem. Int. Ed.* **2022**, doi: 10.1002/anie.202115030.