

Crushing Chemistry

❖ NSF Center for the Mechanical Control of Chemistry ❖

June 2025

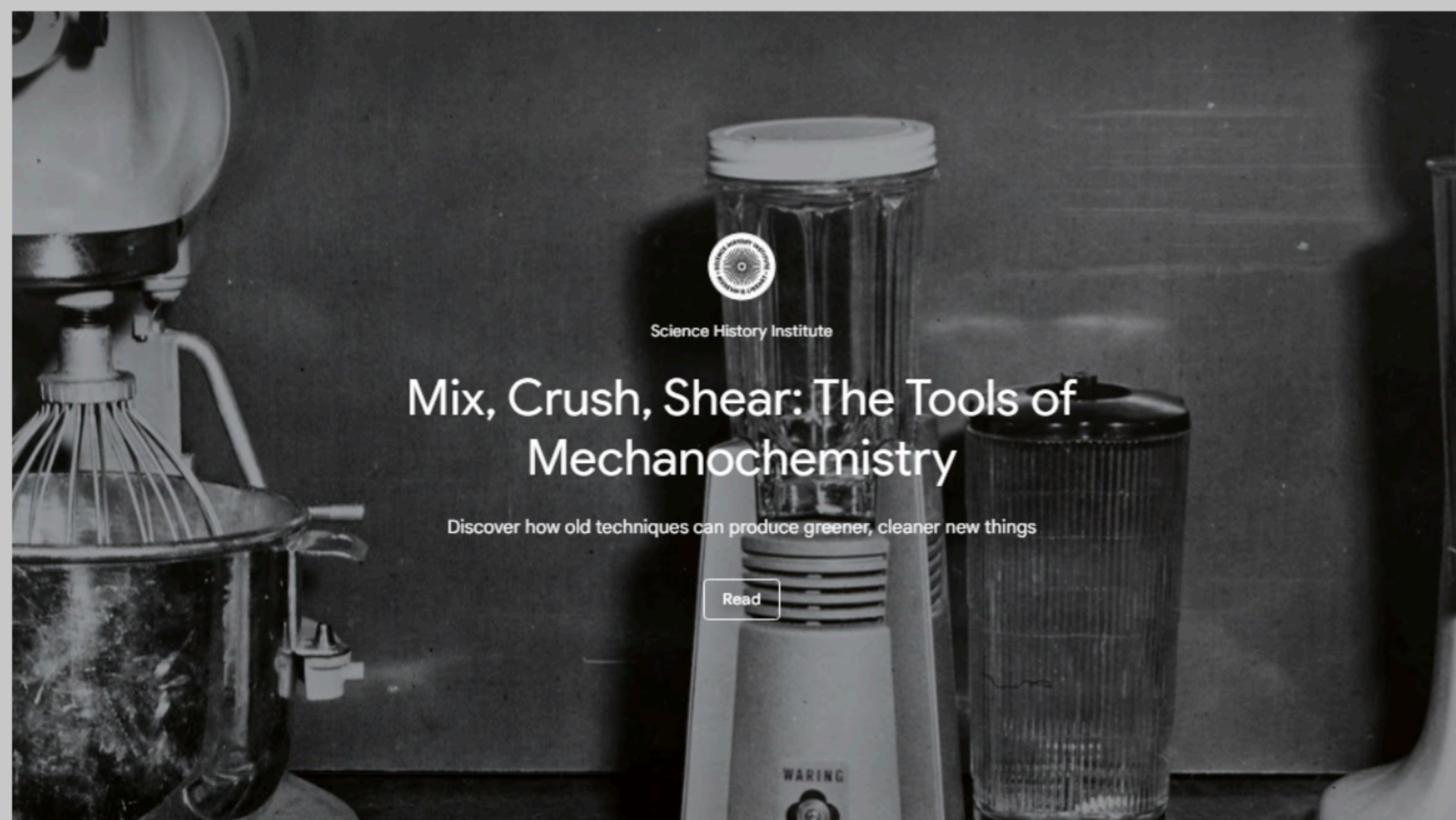
CMCC Hosts Its First Successful REU Bootcamp



Photo Left to Right: Ahmad Tantish, Jonathan Lopez-Hernandez, Sophia Servagno, Mackenzie Gray, Alessandro D'Amico, Jessica Chung, Paige Burch, Faye Liu, Ciarra Moore, and Sophia Guinea in the Mechanochemistry Innovation Hub (MIH).

This May, for the first time, the CMCC brought all 2025 REU participants to Texas A&M University for a Mechanochemistry Bootcamp. Students attended lectures from CMCC graduate students and faculty, took part in hands-on experiments such as creating fluorescent oobleck and visualizing flow in a resonant acoustic mixer, and received data acquisition training from Dr. Emmanuel Nwoye, manager of the MIH. They also participated in social events aimed at building community and encouraging collaboration across institutions. The bootcamp was organized by Outreach Coordinator Dr. Frankie Antillon and led by CMCC graduate students Lizette Mella, Katie Floyd, Lindsay Lerma, Maya Costales, and EJ Broker from the Batteas group.

Discover the Tools Behind Mechanochemistry in Our New Digital Exhibit



We are excited to share the launch of *Mix, Crush, Shear: The Tools of Mechanochemistry*, our new digital exhibit hosted on the Google Arts & Culture platform. This exhibit highlights the key instruments that have shaped mechanochemistry, from the classic mortar and pestle to advanced high-energy ball mills. Learn how these tools are driving new discoveries in chemistry, energy efficiency, and sustainability.

This exhibit was created in partnership with the **Science History Institute**. We are grateful for their collaboration and hard work in bringing this fascinating story to the public.

Scan the QR code to check out the exhibit!



Recent Conference Presentations From CMCC Faculty



Dr. Alison Altman, Professor at Texas A&M University, presented "Gaining Orbital Control in Magnetic Lanthanide Materials Using High-Pressure Techniques" at the Topological and Correlated Matter Gordon Research Conference in Castelldefels, Spain.



Dr. Andrew Rappe, Professor at the University of Pennsylvania, presented "Tribochemical Activation of Diels-Alder Cycloaddition Reactions" at the Society of Tribologists and Lubrication Engineers Annual Meeting in Atlanta, Georgia.

Scan the QR code to access the Spanish version!
¡Escanee el código QR para acceder a la versión en español!



CMCC Researchers Featured in *New Scientist*

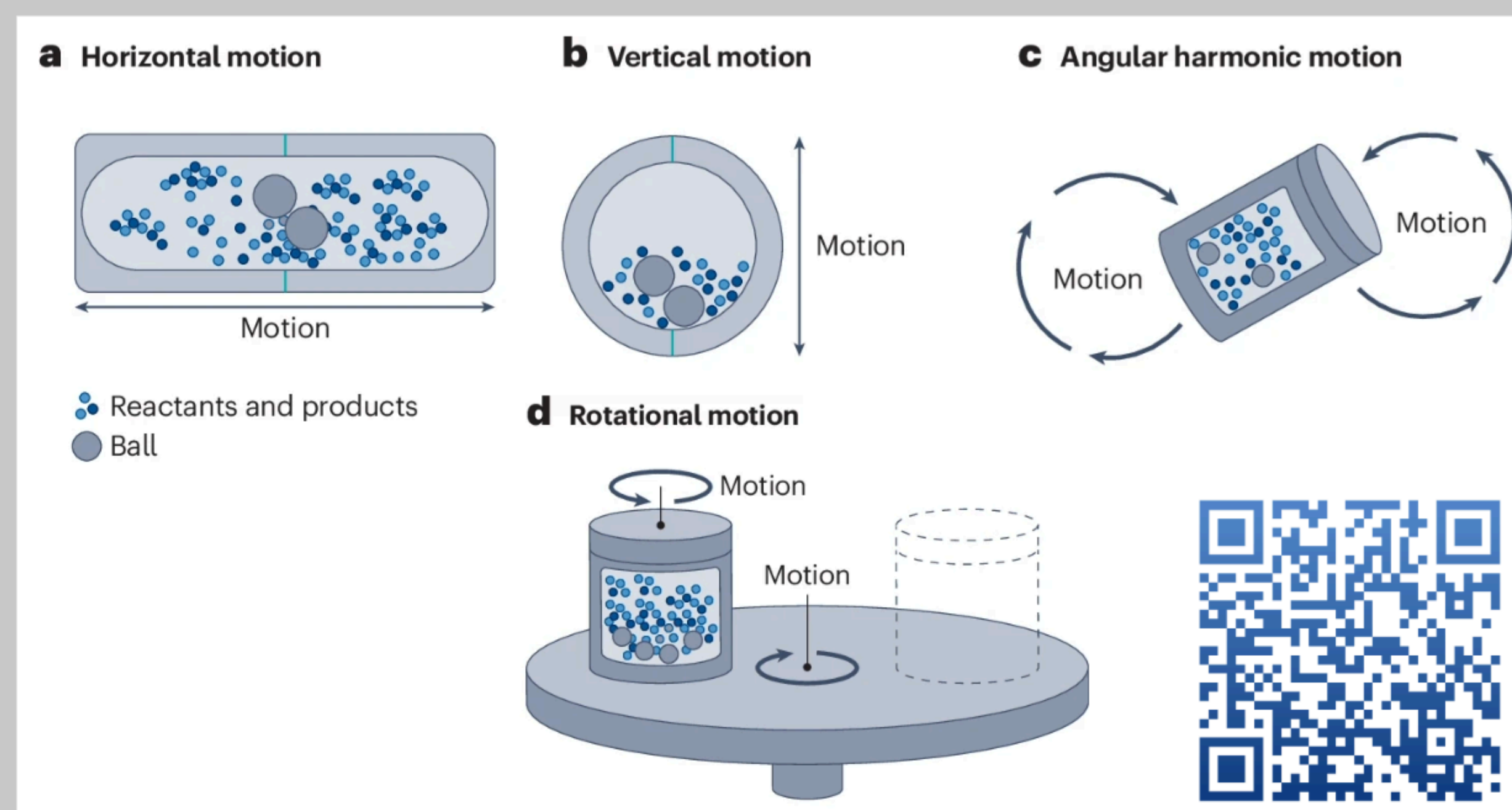


Mechanochemistry involves smashing and grinding powders together

Bennett, Hayley. "How an Ancient Alchemy Technique Is Transforming Modern Chemistry." *New Scientist*, 23 May 2025, www.newscientist.com/article/2479332-how-an-ancient-alchemy-technique-is-transforming-modern-chemistry/. Accessed 16 June 2025.

This month, CMCC Director Dr. James Batteas and Lead Investigator Dr. Tomislav Friščić were featured in *New Scientist* in an article titled "Mechanochemistry: How an ancient alchemy technique is transforming modern chemistry" by Hayley Bennett. The piece highlights how mechanical force is being used to drive chemical reactions and promote more sustainable synthesis. Dr. Batteas notes that reactions are often "faster" and "cleaner," with fewer byproducts, while Dr. Friščić points to the potential for large-scale, solvent-free synthesis using equipment similar to "cement mixers." This article showcases the growing impact of mechanochemistry and the CMCC's leadership in sustainable chemical innovation.

New Publication in *Nature Reviews Methods Primers*



Speight, I.R., Ardila-Fierro, K.J., Hernández, J.G. et al. Ball milling for mechanochemical reactions. *Nat Rev Methods Primers* 5, 29 (2025). <https://doi.org/10.1038/s43586-025-00401-2>

If you've ever wanted to explore the world of mechanochemistry but weren't sure where to start, this new publication is for you. A recent article in *Nature Reviews Methods Primers*, from the Speight (William & Mary) and Mack (University of Cincinnati) labs, offers a comprehensive and accessible introduction to conducting mechanochemical research. The primer walks readers through the key components of mechanochemical experimentation, including how to select the right ball mill, adjust milling parameters, and monitor reactions effectively. It also provides detailed guidance on designing experiments, addressing challenges unique to solid-state reactions, and ensuring safe and reproducible results. Whether you're a student, a seasoned chemist, or someone looking to expand your lab's methods toolbox, this resource is a must-read.

This Month in the MIH: The Retsch MM 500 Control

The Mechanochemistry Innovation Hub officially opened last month, offering a new collaborative space equipped with specialized tools to support the growing needs of the mechanochemistry community. As part of our effort to highlight the capabilities of this space, each month we will feature one of the instruments available for use in the MIH. This month we are highlighting the **Retsch MM 500 Control**, a high-frequency mixer mill designed for the dry, wet, and cryogenic grinding of small sample amounts. Known for its precision and versatility, the MM 500 Control is ideal for sample preparation in mechanochemistry research, offering both power and control to meet a wide range of experimental needs. We invite all researchers to visit the MIH, explore its capabilities, and consider how the tools housed in this space can help advance current projects or inspire new directions in your research.

