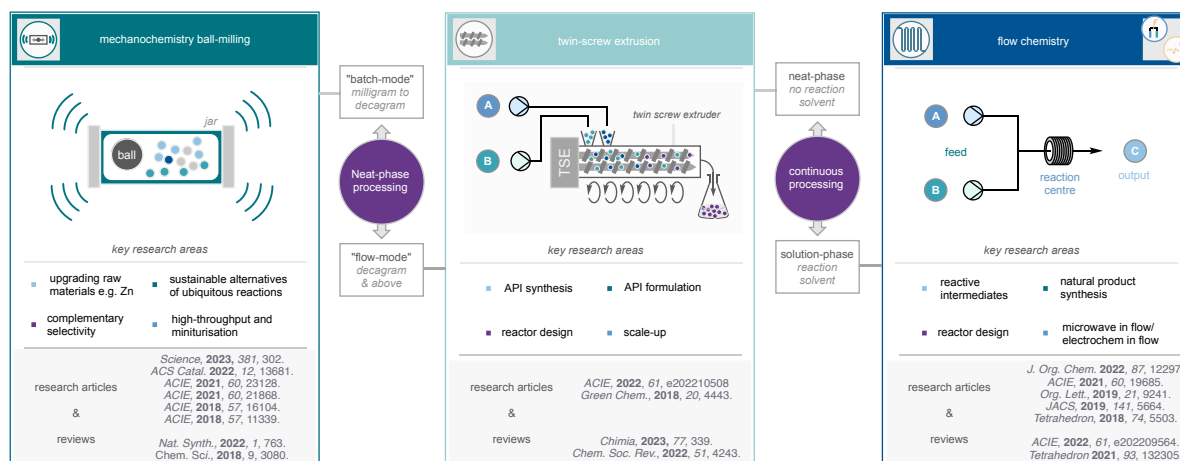


THE DIFFERENT SCALES OF MECHANOCHEMISTRY

Duncan L. BROWNE^a

^a Department of Pharmaceutical and Biological Chemistry, School of Pharmacy, UCL, 29-39 Brunswick Square, London, WC1N 1AX, UK
duncan.browne@ucl.ac.uk

The Browne research group focuses on the use of mechanochemistry and continuous processing for the making and breaking of organic molecules. This seminar will focus on the use of ball-milling methods to run reactions in the absence of a bulk reaction solvent. The ball-milling device inputs mechanical and thermal energy to elicit a chemical transformation. Whilst the use of mechanochemistry has been known for some time; in areas such as formulation, crystal engineering, forensics and geology, its use for the construction of organic molecules is relatively new. The potential solvent savings afforded by mechanochemistry techniques are particularly appealing at larger scales. This talk will focus on the concurrent development and discovery of new opportunities for molecular synthesis by small scale mechanochemistry (using a ball-mill device) and translation of these methods to larger-scale solvent-minimised processes through continuous mechanochemistry using a twin-screw extruder.¹



¹ For examples of reactive extrusion see the work of: James, Crawford, Speight, Lamaty, Kulkarni, Colacino and others; for reviews and publications from our group see: a) R. R. A. Bolt, J. A. Leitch, A. C. Jones, W. I. Nicholson, D. L. Browne, *Chem. Soc. Rev.* **2022**, *51*, 4243-4260; b) J. A. Leitch, P. Richardson, D. L. Browne, *Chimia*, **2023**, *77*, 339-345; c) Q. Cao, J. L. Howard, D. E. Crawford, S. L. James, D. L. Browne, *Green Chem.* **2018**, *20*, 4443-4447; d) R. R. A. Bolt, S. E. Raby-Buck, K. Ingram, J. A. Leitch, D. L. Browne, *Angew. Chem. Int. Ed.*, **2022**, *61*, e202210508; e) R. R. A. Bolt, H. R. Smallman, J. A. Leitch, G. W. Bluck, F. Barreateau, A. Iosub, D. Constable, O. Dapremont, P. Richardson, D. L. Browne, *Angew. Chem. Int. Ed.* **2024**, *63*, e202408315.