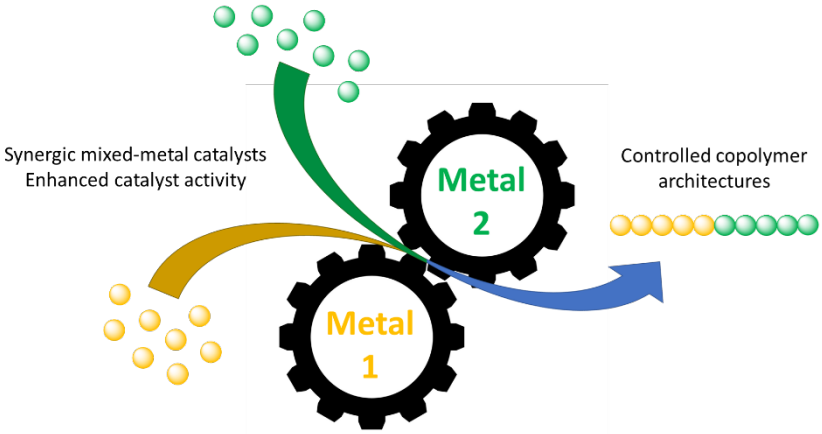
Harnessing Heterometallic Synergy in the Synthesis, Post-Polymerisation Modification and Depolymerisation of Polyesters

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Abstract:
Synergy occurs when the combined efforts of different components produce a result that exceeds the sum of their individual contributions - in other words, the overall effect is "greater than the sum of its parts".[1-2] In a world where sustainability and circular economy are becoming increasingly crucial, harnessing synergy is an attractive method for achieving more with fewer resources. This concept can be applied at various levels, from enhancing catalyst performance at the molecular level to improving materials, where copolymers and polymer blends can exhibit enhanced strength and degradability.



Mixed-metal (heterometallic) complexes are at the forefront of synergistic catalyst design, and often outperform their homometallic analogues by displaying higher activities and selectivities. This lecture will describe strategies to exploit mixed-metal cooperativity in cyclic ester ring-opening polymerisation, which can enhance the catalytic efficiency by up to 10 times compared to the monometallic analogues.[3] Beyond polymerisation, this lecture will also describe advances in synergistic catalyst design for polymer modification and depolymerisation.[3-5]

References:

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Jennifer A. Garden received her MSci (1st Class, Hons) and her PhD from the University of Strathclyde, the latter under the supervision of Prof. Robert Mulvey. This was followed by two years as a postdoctoral researcher in the group of Prof. Charlotte Williams at Imperial College London. In 2016, Jenni moved to the University of Edinburgh as the first recipient of the Christina Miller Fellowship, which was followed by a Ramsay Memorial Fellowship, a L'Oréal-UNESCO For Women in Science UK & Ireland Fellowship and a UKRI Future Leaders Fellowship. The work of Jenni and her team has been recognised by several awards including the 2019 Macro Group Young Researcher Medal and the 2021 RSC Sir Edward Frankland Fellowship.