

Preface

The ability to synthesise molecules in a controlled manner is essential for the development of products used in everyday life, such as plastics, fabrics, fertilisers and pharmaceuticals. With ever-growing global chemical demand and energy consumption, the development of efficient, energy-saving synthetic processes is of paramount importance. Catalysis offers the single most powerful method that can be used to improve the yield and efficiency of molecular synthesis whilst also reducing waste and energy consumption. Iron is one of the most abundant elements on earth and therefore is the ideal choice as a catalyst for future applications.

This work developed novel reactions catalysed by an inexpensive, non-toxic and environmentally benign iron catalyst. The controlled and efficient synthesis of a range of molecular structures was achieved. Experiments have provided insight into how these reactions work, which should not only provide a greater understanding of the science involved, but also direct future developments towards highly efficient catalysts and catalytic processes.

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Alkynes

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