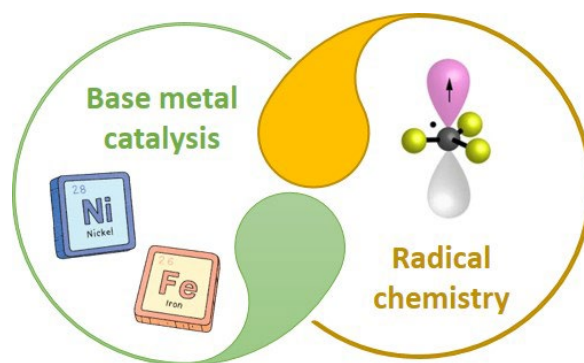


A3-09

Sustainable Chemical Synthesis through Base Metal Catalysis and Radical Chemistry

Ming Joo Koh (National Univ. of Singapore)

Chemical manufacturing is a key pillar of the global economy and plays a crucial role in the modern human society. Chemical catalysis is an indispensable tool to promote reactions that enable access to various classes of chemicals, ranging from small-molecule medicines to polymeric materials. Despite considerable advances made in this area, much of it depends on the use of exorbitant and scarce noble metals to prepare catalysts. Furthermore, such precious metal-derived catalysts can only mediate a limited range of reactions. As a result, longer synthetic sequences are often needed to convert a starting material to the desired target product. Unfortunately, each step in a chemical synthesis process consumes energy, resources and time, and generates waste (spent carbon-based solvents and other by-products) that has to be treated or incinerated¹. Consequently, this leads to more CO₂ and other toxic emissions that contribute to global warming, climate change and other undesirable environmental problems. To address these challenges, our research focuses on the development of cheap catalyst systems derived from abundant base metals such as iron and nickel², as well as radical-based cross-coupling reactions³. In this talk, an overview of our efforts in various innovative approaches to transform cheap and abundant feedstock chemicals into value-added products with lower environmental footprint will be presented.



- 1) *Management of toxic industrial wastes in Singapore*. <https://www.nea.gov.sg/docs/default-source/our-services/management-of-hazardous-waste>.
- 2) Y. Wei, L. Q. H. Lin, B. C. Lee, M. J. Koh, *Acc. Chem. Res.* **2023**, 56, 3292.
- 3) Y. Jiang, Y. Zhang, B. C. Lee, M. J. Koh, *Angew. Chem. Int. Ed.* **2023**, 62, e202305138.

PROFILE

Ming Joo Koh (National University of Singapore, Dean's Chair Professor)

Koh was born and raised in Singapore. He received his B.Sc. degree (First Class Honors) in Chemistry & Biological Chemistry from Nanyang Technological University in 2012, before heading to Boston College for his Ph.D. and post-doctoral studies under the supervision of Prof. Amir Hoveyda from 2012–2018. Koh joined the Department of Chemistry at the National University of Singapore as a President's Assistant Professor in 2018, and was promoted to Associate Professor with tenure in 2023. Koh is currently a Dean's Chair Professor, and his research focuses on developing sustainable and practical catalytic solutions that address critical challenges in chemical synthesis through base metal catalysis and radical cross-coupling. His work has been published in top scientific journals such as *Nature*, *Nature Catalysis* and *Nature Chemistry*. Koh is a recipient of multiple awards including the Asian Core Program Lectureship Awards for Japan, Korea, China, Taiwan and Thailand (2019, 2022, 2023), Innovators Under 35 (TR35) Asia Pacific Award (2021), TCI-SNIC Industry Award in Synthetic Chemistry (2021), Thieme Chemistry Journals Award (2022), C&EN's Talented 12 Award (2022), Young Scientist Award, SNAS (2022), Young Researcher Award, NUS (2023) and Novartis Early Career Award in Chemistry (2023). Outside of work, Koh enjoys jogging, exercising and music. Email: chmkmj@nus.edu.sg