

More than just an analytical method! Using Mass Spectrometry to Build Bridges between Gas and Solution Phase Metal Chemistry.

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Mass spectrometry based techniques have been developed over the past 50 years to provide fundamental structural, mechanistic and energetic information about intermediates and reactions associated with metal mediated processes, including catalytic cycles [1]. Many early studies involved the reactions of bare monoatomic transition metal cations, which unfortunately gave rise to the perception that gas-phase studies had little or no relevance to synthetic chemists. With the advent of electrospray ionisation, and with an appreciation of the differences in “languages” of the gas-phase and solution-phase chemist [2], exciting opportunities to bridge the gas and solution phases have emerged, thereby allowing the discovery of new species, reactions and concepts. In this lecture I will describe our efforts at using mass spectrometry to bridge the gas and solution phases to: (1) direct the synthesis of metal clusters; (2) discover new metal catalysts; (3) invent new metal-mediated reactions.

References:

- [1] O'Hair, R. A. J., *Mass Spectrom. Rev.*, **2021**, *40*, 782
- [2] Agrawal, D.; Schröder, D., *Organometallics*, **2011**, *30*, 32