

Preface

Privileged ligands play a key role in the development of organometallic chemistry, homogeneous catalysis and metal-mediated and -catalysed organic synthesis. Among the monoanionic, multidentate ligands, the Cyclopentadienyl (Cp) fragment is no doubt the most frequently used metal-binding platform. In fact, the hallmark isolation and structural elucidation of ferrocene represented a key benchmark moment in the development of organometallic chemistry [1].

In recent times, monoanionic Pincer [2] ligands have also become one of the privileged ligand platforms and are being used with increasing success; indeed sometimes astonishing results in all the three of the fields mentioned above can be realised with a single pincer framework. In a similar fashion to the Cp ligands, the Pincers bind to a metal centre as a multidentate ligand but, in addition, often engenders a number of unanticipated properties both in the way it interacts and also interplays with the metal fragment(s). In this book, we focus on pincer ligands of the type ECE' (Fig. 1). Initially, Pincer ligands had been designed simply as platforms intended to enforce *trans*-spanning bisphosphine (PCP [3]) or bis-sulphide donors (SCS [4]) or to act as a rigid *mer*-tridentate (NCN [5, 6]) ligand. However, in present times, now some 40 years later, the pincer-ligand platform has developed into a multifunctional building block that is used in a wide variety of metal complexes for a number of more diverse applications. These can include, for example, bond activation, organic synthesis, supramolecular chemistry, homogeneous catalysis, polymer chemistry, photochemistry and novel energy-related science [7–12].

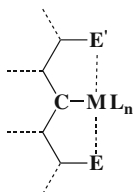


Fig. 1 Representation of the ECE' pincer-metal complexes with a central σ -M-C bond of a ML_n fragment to the monoanionic carbon centre (E and E' are neutral donor atom groupings) featuring in the chemistry covered in this volume. Note that in most compounds, the pincer ligand acts as a 6e ligand with both E and E' coordinating to M, see also Fig. 2 in ref. [13].

The aim of this volume of *Topics in Organometallic Chemistry* is to focus on the latest developments of pincer–metal chemistry based on complexes derived from monoanionic ligands as defined in Fig. 1.

This volume starts with a brief outline of both the scope of organometallic chemistry that makes use of the ECE' pincer platform and the applications of these compounds. In the following contributions, the main emphasis is on a discussion of the various synthetic aspects of new pincer–metal complexes (both transition and main group metals and metalloids), their structural features and details as to the interplay between the ligand's backbone and the metal centre (non-innocent behaviour, photochemical properties, etc.). Furthermore, this volume contains reports on both the synthesis and the applications of the pincer–metal complexes in metal-catalysed organic synthesis and materials science.

We hope that this volume not only informs the reader about the newest developments of the carbon-based pincer platform as a privileged ligand but also acts as an inspiration to the reader to use pincer–metal complexes in their own scientific endeavours.

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