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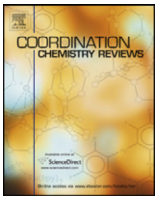

Preface

Preface to the CCR Special Issue on Main Group Chemistry

From a fundamental perspective the traditional roles of main-group (s- and p-block) elements have been to provide (a) compounds with unusual structures or functionalities that introduce new aspects of chemical bonding and (b) reagents for organic synthesis. In terms of industrial importance, p-block element compounds represent a very large percentage of commercial production of inorganic chemicals. During the past decade in the context of various societal challenges, Main Group Chemistry has attracted increasing attention because of the wide variety of properties that can be generated by compounds of the more than 40 main-group elements, as well as the relatively high natural abundance and, hence, low cost of some of these elements compared to transition metals or lanthanides. As a result it is becoming evident that main group chemistry is poised to play an increasingly important role in areas ranging from materials science to medicine and including, *inter alia*, applications in catalysis and in the hydrogen economy and electronics industries.

In the past 3 years this activity has been recognized by several special symposia and publications devoted to Main Group Chemistry. In June 2008 the Royal Society of Chemistry (U.K.) organized a Dalton Discussion meeting on the topic “The Renaissance of Main Group Chemistry” in Berkeley, California and a special thematic issue of Dalton Transactions containing the oral presentations at that symposium was subsequently published [Dalton Trans. (2008) 4312–4524]. In 2010 a thematic issue of Chemical Reviews was dedicated to this topic with an emphasis on Groups 13, 14 and 15 elements [Chem. Rev. 110 (2010) 3851–4488]. Late last year a special themed issue of the New Journal of Chemistry dedicated to Main Group Chemistry was published in connection with three symposia that were held at the Pacifichem meeting in Honolulu in December 2010; this contains a broad spectrum of papers on s- and p-block element chemistry (New J. Chem. 34 (2010) 1495–1782]. A recent review entitled “The Future of Main Group Chemistry” [Comments Inorg. Chem. 30 (2009) 131–176] draws attention to many of the exciting advances that have occurred in the last decade and points out the potential of Main Group Chemistry to respond to societal demands in areas such as alternative energy sources, green chemistry, smart materials and new medicines for both diagnostic and therapeutic applications. Finally, an apposite article entitled “Main Group Elements as Transition Metals” [Nature 463 (2010) 171–177] opines that the chemistry of heavier main-group elements resembles that of transition-metal complexes more closely than that of their lighter main-group congeners.

In this special issue of Coordination Chemistry Reviews 10 articles cover a range of s- and p-block chemistry that is representative of current trends in the field with an emphasis on coordination chemistry. The article by Davies discusses the structures of lithium and magnesium organocuprates that are used in organic synthesis for C–C bond formation. Harder presents the chemistry of group 1 and 2 derivatives of geminal dianions stabilized by phosphonium substituents with an emphasis on bonding, while Ruhlandt-Senge et al. provide an account of recent developments in alkaline earth-nitrogen compounds, which have applications in catalysis and as polymerization initiators. Several articles draw attention to the use of main group compounds as solid-state precursors to useful binary materials, e.g. gallium and indium oxide thin films (Carmalt et al.) and metal phosphides (Hey-Hawkins and Gomez-Ruiz). The coordination chemistry of silicon and germanium halides is surveyed by Levason, Reid and Zhang in a review that highlights important recent developments in the characterization of complexes of divalent Si and Ge halides. Phosphorus chemistry is represented in the articles on the activation of elemental phosphorus by p-block element compounds by Masuda and Giffin and the discussion of the coordination chemistry of linear and cyclic oligophosphanide anions by Hey-Hawkins and Gomez-Ruiz, while Kilian et al. provide a comprehensive account of the coordination complexes of peri-substituted naphthalene ligands with group 15 or 16 donor centers. The ability of neutral donor ligands to stabilize electron-deficient polycations of group 13, 14, 15 and 16 elements is featured in the article by Ragogna and Dutton. Finally, Vargas-Baca et al. discuss the secondary bonding interactions that occur in tellurium compounds that contain donor functionalities with a view to their applications in crystal engineering.

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