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Preface

The main group elements are the most common in the universe and widely distributed in the earth's crust and for this reason are critical components of living organisms. Their abundance, availability, and range of properties make them useful for a multitude of applications and they are central to some of the most important and widely used chemicals, past and present, in the world. The main group elements are useful and fascinating because they display a very broad range of properties and bonding. For example, multiple bonding is prevalent in the 2nd Period but rare for the 3rd Period and heavier elements. It was only in the 1980s with the advent of double-bonded silicon and phosphorus compounds that the "double bond rule" was broken. A combination of the d-orbital contraction for the 3rd period and relativistic effects for the 5th period leads to remarkable differences among compounds even when they are from the same Group. For instance, the "inert s-pair effect" allows for the isolation and utilization of lower oxidation state compounds in the 3rd period and below.

The uniqueness, utility, and versatility of the main group elements have been known since ancient times. Oxide and sulfide minerals of these elements are widely distributed and easily accessible on the earth. Early Mediterranean civilizations used many main group minerals as pigments including yellow lead antimonite ($PbSb_2O_5$), red-orange realgar (As_4S_4), and red cinnabar (HgS). Various colors and hues of these minerals could be isolated by grinding the pigments to specific particle sizes. Blue pigments were rare and expensive since they were derived from the relatively uncommon minerals azurite ($Cu_3(CO_3)_2(OH)_2$) and ultramarine (a component of the semi-precious gemstone, lapis lazuli). Ultramarine is an aluminosilicate with an encapsulated radical anion, S_3^-, providing the intense blue color. It demonstrates how several different main group elements can be combined in one compound to give unique structural and electronic properties. Over 4,000 years ago Egyptians adventitiously prepared the first synthetic blue pigment, calcium copper silicate ($CaCuSi_4O_{10}$). Paintings with this synthetic pigment are still in existence today. Much later, in the new world, Maya Blue was made by combining white clay (attapulgite) and indigo, providing an early example of an inorganic-organic composite material. Thus, main group chemistry was central to the history of blue, royal, pigments and the development of art over several thousands of years.

The location of the main group elements on the Periodic Table and their broad applicability makes them suitable for the creation of new compounds and applications, and the discovery of new chemical structures and bonding. Main group chemistry is truly a holistic, transdiscplinary field of endeavor as exemplified in the history of pigments and many other ancient technologies. This is even more true today. Considering the broad influence main group chemistry has had on science and society, it is important to have a single journal that highlights this growing field of interdisciplinary research.

Main Group Chemistry is the ideal publication for the diverse range of fundamental and applied chemistry incorporating elements using s and p orbitals in their bonding. This includes the typical main group elements from the groups 1, 2, and 13–18, as well as those from the group 12, lanthanides, and actinides. *Main Group Chemistry* began in 1995 and has steadily grown in quality and impact by selecting the best possible articles to publish in the four issues that comprise each annual volume. *Main Group Chemistry* intends to become the primary publication for new and exciting developments in the chemistry of the main group elements.

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