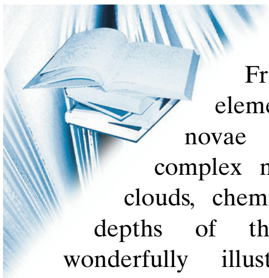

Chemistry in Space

From the formation of the elements in stars and supernovae to the assembly of complex molecules in interstellar clouds, chemistry is thriving in the depths of the universe. This is wonderfully illustrated in the book *Chemistry in Space—From Interstellar Matter to the Origin of Life* by Dieter Rehder, which gives an up-to-date account of present knowledge about the diversity of chemical reactions throughout the universe. As a consequence of the extreme environment in outer space, the book deals with chemical systems that are far from everyday laboratory chemistry. Thus, it provides new insights and food for thought for chemists from many research areas.

The author tackles the vast field of astrochemical research in a clearly structured and chronological order, starting with a brief introduction about the beginnings of space and time as we understand it today, where he also introduces key concepts of cosmological chronometry, providing a timeline of the early development of the universe. This is followed by a detailed discussion of the life cycle of stars, starting with their formation from dense interstellar clouds and continuing through to their evolution by complex nuclear fusion processes. This is particularly important for all chemists, as it demonstrates how stars act as incubators, forming chemical elements through nuclear fusion of light elements such as hydrogen and helium.

The following chapter forms one of the main sections of the book and describes the wide range of chemical reactions and molecules found in interstellar clouds. In addition, the author discusses the principal methods of detection using spectroscopic methods in conjunction with telescope observations. Particular attention is devoted to surface reactions that take place on interstellar dust particles, thereby highlighting the importance of heterogeneous solid–gas reactivity at low temperatures.

The central chapter of the book looks at our solar system and discusses in detail the geochemical characteristics of planets and other relevant objects in the solar system. The chapter is subdivided into sections dealing with the "terrestrial" planets Mercury, Venus, and Mars, planetoids and comets, and the giant planets Jupiter, Saturn, Uranus, and Neptune, as well as their moons. For obvious reasons the chemistry of Earth is not discussed.

A short chapter is devoted to the growing field of exoplanets research, and discusses the four principal types of exoplanets, together with the key signatures of so-called "super Earth" exoplanets, which are considered to be planets with the potential to support life.

The final chapter provides an excellent overview of the various hypotheses about the formation of life on Earth, and offers an ideal introduction to this broad topic, covering aspects that range from the definition of life through to Wächtershäuser's iron–sulfur world, as well as the famous Miller–Urey "primordial soup" experiments of the 1950s.

In summary, this book can be highly recommended to all chemists from graduate level upwards, as it provides a concise and up-to-date overview of a thriving area of chemistry, which has important links to many fields of chemical research. In addition to the excellent figures throughout the book, each chapter provides up-to-date references to recent key publications in the primary literature. Short summary paragraphs at the end of each section allow readers to review the most important information at a glance.

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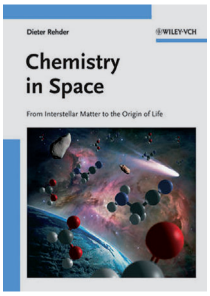

Chemistry in Space
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