

CHAPTER 1

Introduction

As the title of this book, *A Serious Glance at Chemistry: Basic Notions Explained*, suggests, we intend to provide some carefully chosen concepts of our present day understanding of chemistry, without subjecting the reader to many mathematical and technical refinements and intricacies. We also, arbitrarily, skip topics which we believe to be of minor interest to readers not oriented to become professional chemists. Whenever possible, we make connections between chemical processes or materials and everyday human needs and concerns. We also emphasise the crucial role of chemistry in living beings.

In Chapter 2, we discuss in some detail the electronic structure of the hydrogen atom. On that basis, many-electron atoms are described qualitatively.

Chapter 3 provides some rationale on how molecules are built, electron density distribution and chemical bonds.

In Chapters 4 and 5, we present organic and inorganic molecules at the level and detail suitable for the purpose of this book.

Modern physico-chemical science is riddled with concepts brought in by quantum mechanics, born in the beginning of the twentieth century. It seems quite appropriate to describe this intellectual creation in Chapter 6 and how it gave origin to a new science, quantum chemistry. The manner in which these new concepts penetrated our concepts of molecular structure is the subject of Chapter 7.

Chapter 8 describes the atomic nucleus as a fundamental piece of the atomic structure; this chapter includes a few remarks on the present notion of the building of elementary particles.

In Chapter 9, we describe various types of chemical transformations and some notions on thermodynamic and kinetic control of chemical reactions.

Chapter 10 is the main piece of this work, focusing on the important issue of energy sources. Special attention is given to chemical-related energy sources, as combustion and fuel cells, although other options for energy production are listed and briefly commented on. We strongly address the risks to our environment and humanity itself.

We consider the closing Chapter 11 as important or more so than the previous chapter. We attempt to summarise most of the structures and processes in which chemistry, biochemistry, biology and biophysics have a crucial role in living beings. We go from relatively simple systems such as vitamins to extremely complex structures such as enzymes and receptors. Always with the aim of avoiding elaborate specific terms and concepts, a marvelous nature is presented to the reader, including, vision, nervous conduction, enzymes and genetic information.

After the last Chapter we draw some Final Remarks and we interview a Brazilian environmental researcher. Various options for Further Reading are offered, including Web Sites for Self Learning. We also provide five Appendices which complement the information in the text.