PREFACE

Having decided to go on this project of making a chemistry book for engineers, the main problem faced was deciding what to write. There was no similar treatise which I could select or look at. The first requirement what I thought for a long while is a good review of the necessary chemistry which links high school chemistry and college chemistry and also a short introduction of the chemistry undergraduate major requirement. These are a total of five different subjects – physical chemistry, inorganic chemistry, organic chemistry, analytical chemistry and surface chemistry. Could the basic concepts of these five subjects become sufficient for review of the essential part of chemistry for the need or basic tools for an accomplished engineer?

The next effort is in determining to what extent any subject should be covered. For example, for organic chemistry, there are thousands of important compounds or nomenclature, thousands of chemical synthesis, thousands of named reactions and thousands of important mechanisms. The question is whether any engineer needs to learn these or familiarize with them. So one has to select, shorten and abstract the necessary basic principles for engineers, with limited space to cover the entire subject. One can always be blamed for being arbitrary and subjective. The author's forty years of experience in teaching engineering students and contacts with engineering societies has solved some of the difficulties which were encountered by others.

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Credit to Oxford University Press and to C.M.Dobson, J.A.Jerrard and A.J.Pratt, *Foundation to Chemical Biology*, 2001, Fig. 1.2 for Fig. 6-1 ; Figs. 1.7 and 1.8 for Fig. 6-2; Fig. 2.2 for Fig. 6-4; Fig. 2.9 for Fig. 6-8; Fig. 3.2 for Fig. 6-9; Fig. 3.7 for Fig. 6-10; Fig. 3.8 for Fig. 6-11; Fig. 3.11 for Fig. 6-13; Fig. 3.12 for Fig. 6-15; Fig. 3.13 for Fig. 6-16. Credit to Springer-Verlag Inc. and to B.D.Hames and N.M.Hooper, *Biochemistry*, 4th ed., 2000, p. 48, Fig. 4 for Fig. 6-14; p. 137, Fig. 1 and Fig. 6-24; p. 138, Fig. 2 for Fig. 6-25. Credit to Elsevier Science Publishers and D.Koruga, S.Hameroff, J.Withers, R.Loutfy and M.Sundareshan, *Fullerene*, 1993, F: 5. 1-2 (p. 142) for Fig. 6-26 and Fig. 6-27; F: 5. 1-3 (p. 143) for Fig. 6-28; F: 5.24 (p. 150) for Fig. 6-29; F: 5.3-4 (p. 158) for Fig. 6-30. Credit to John Wiley and Sons and to D.Voet and J.G.Voet, *Biochemistry*, 1990, Fig. 32-2 for Fig. 6-31; Fig. 28-34 for Fig. 6-32; Fig. 28-35 for Fig. 6-33; Fig. 32-38 for Fig. 6-33A; Fig. 32-11 for Fig. 6-34; Fig. 32-12 for Fig.6-35. Credit to Cambridge University Press and to K.E.Peters, C.C.Walter and J.M.Moldowan, *The Biomarker Guide*, 2nd ed., II *Biomarkers and Isotopes in Petroleum Systems and Earth History*, 2005; Fig. 12.4 for Fig. 7-9; Fig. 18.85 for Fig. 7-11; Fig. 18.118 for Fig. 7-13; Fig. 19.1 for Fig. 7-14; Fig. 19.16 for Fig. 7-15; Fig. 18.131 for Fig. 7-16; Fig. 18.138 for Fig. 7-17; Fig. 13.63 for Fig. 7-32. Credit to Columbia University Press and to G.Ottonello, *Principles of Geochemistry*, 1997, Fig. 11.14 for Fig. 7-23; Fig. 11.16 for Fig. 7-24; Fig. 11.27 for Fig. 7-26; Fig. 11.29 for Fig. 7-27. Credit to John Wiley and Sons and to G.Faure, *Isotope Geology*, 2nd ed., 1986, Fig. 6.2 for Fig. 7-25. Credit to Cornell University Press and P.-G. de Gennes, *Scaling Concepts in Polymer Physics*, 1979, Fig. 4-1 used for Fig. 9-7. Credit to Nature Publishing Corp. and to J. Klein, *Nature*, **271**, 143, 1978, Fig. 2 used for Fig. 9-8. Credit to John Wiley and Sons and to S.C.Rosen, *Fundamental Principles of Polymer Materials*, 2nd ed., 1993, Fig. 14.1 used as Fig. 9-14; Fig. 14.2 as Fig. 9-15; Fig. 14.4 as Fig. 9-16; Fig. 18.1 as Fig. 9-20; Fig. 18.15 as Fig. 9-23; Fig. 18.20 as Fig. 9-24 and Fig. 18.21 as Fig. 9-25.