



Book Review

Physical Chemistry of Foods

Pieter Walstra; Marcel Dekker, Inc., New York, 2003, xiii + 807 pages, ISBN 0-8247-9355-2 (US\$ 95.00)

Knowledge of physical chemistry is of great importance to anyone who is interested in understanding the properties of food, improving its quality and storage stability, and controlling its behavior during handling. This book provides understanding of physical chemistry principles and theories of food science and technology. Moreover, facts and practical aspects are included because knowledge of the system considered is needed to apply theory usefully.

Chapter 1 introduces the importance of physical chemistry in food science and technology, and the main content of this book. Chapters 2–4 provide some basic thermodynamics, interaction forces and chemical kinetics. Chapter 5 is also concerned with kinetic aspects: it covers various transport phenomena and a few mesoscopic aspects are involved, and includes some basic fluid rheology. Chapters 6 and 7 treat macromolecules: chapter 6 gives general aspects of polymers and discusses food polysaccharides in particular, with a largish section on starch; chapter 7 separately discusses proteins, highly intricate food polymers with several specific properties. Chapter 8 treats the interactions between water and food components and the consequences for food properties and processes.

Chapter 9 gives a general introduction on disperse or particulate systems. It concerns properties that originate from the division of a material over different compartments, and from the presence of a large phase surface. Two chapters give basic theory. Chapter 10 is on surface phenomena where the forces involved primarily act in the direction of the surface. Chapter 12 treats colloidal

interactions, which primarily act in a direction perpendicular to the surface. Two chapters are concerned with application of these basic aspects in disperse systems: chapter 11 with emulsion and foam formation, chapter 13 with the various instabilities encountered in the various dispersions: foams, emulsions and suspensions.

Chapter 14 mentions the various phase transitions that may occur, such as crystallisation, gas bubble formation or separation of a polymer solution in two layers; it then treats the nucleation phenomena that often initiate phase transitions. Chapter 15 discusses crystallisation, a complicated phase transition of great importance in foods. It includes sections on crystallisation of water, sugars and triacylglycerols. Chapter 16 introduces glass transitions and the various changes that can occur upon freezing of aqueous systems. Finally, chapter 17 is about soft solids, a term that applies to the majority of foods. It gives an introduction into solids rheology and fracture mechanics, but otherwise it makes use of many of the theories treated in earlier chapters to explain properties of the various types of soft solids encountered in foods.

This book provides comprehensive coverage of food physical chemistry at a depth suitable for students in food science, and will serve as an excellent reference source for food researchers.

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