Argumentation in Chemistry Education
Research, Policy and Practice
Sibel Erduran University of Oxford, UK

Synopsis
Many studies have highlighted the importance of discourse in scientific understanding. Argumentation is a form of scientific discourse that plays a central role in the building of explanations, models and theories. Scientists use arguments to relate the evidence that they select from their investigations and to justify the claims that they make about their observations. The implication is that argumentation is a scientific habit of mind that needs to be appropriated by students and explicitly taught through suitable instruction. Edited by Sibel Erduran, an internationally recognised expert in chemistry education, this book brings together leading researchers to draw attention to research, policy and practice around the inclusion of argumentation in chemistry education.

Brief Contents
- Argumentation in Chemistry Education: An Overview
- Chapter: Teaching and Learning Chemistry through Argumentation
- Interdisciplinarity and Argumentation in Chemistry Education
- Lesson Resources and Teaching Strategies on Argumentation for Secondary Chemistry Education
- Using Computer Technology to Support the Teaching and Learning of Argumentation in Chemistry
- Assessment of Argumentation in Chemistry: A Model for Designing Items
- Research and Practice on Science Teachers’ Continuous Professional Development in Argumentation

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Carotenoid Esters in Foods
Physical, Chemical and Biological Properties
Adriana Z Mercadante University of Campinas, Brazil

Synopsis
Carotenoids are found in some food plants, flowers and animals, in free form and also esterified with fatty acids. Recent research has concentrated on the extent of carotenoid esters in these sources, how to measure their presence and the amount available for potential health effects. Focusing on the occurrence and assembly in foods, biosynthesis, analytical methods for identification and quantification, dietary intake and metabolism, the most recent research is represented and a balanced overview of what is known about carotenoid esters is provided. This book is a must-have source for researchers in food science, nutrition and the food industry.

Brief Contents

- Part 1: Physical and Chemical Properties of Carotenoids
- Part 2: Carotenoid Biosynthesis and Occurrence of Carotenoid Esters - General Overview of Carotenoid Biosynthesis
- Part 3: Analytical Methods for Determination of Carotenoid Esters - Extraction and Cleanup of Xanthophyll Esters
- Part 4: Dietary Intake, Digestion, Absorption and Metabolism of Carotenoids and their Esters - Dietary Intake of Carotenoids: Nutritional Status Assessment and the Importance of Considering Free and Esters Forms in Foods
- Part 5: Final Remarks - Carotenoid Esters: Opening New Perspectives and Trends

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Knowledge-based Expert Systems in Chemistry
Artificial Intelligence in Decision Making

Philip Judson

Synopsis
There have been significant developments in the use of knowledge-based expert systems in chemistry since the first edition of this book was published in 2009. This new edition has been thoroughly revised and updated to reflect the advances. Written by a pioneer in the field, this book provides an essential reference for anyone interested in the uses of artificial intelligence for decision making in chemistry.

Brief Contents
- Artificial intelligence – making use of reasoning
- Synthesis Planning by Computer – the LHASA Program
- Other Early Programs for Chemical Synthesis Planning
- International Repercussions of the Harvard LHASA Project
- Current Interest in Synthesis Planning by Computer
- Structure Representation
- Structure, Sub-Structure, and Super-Structure Searching
- Protons That Come and Go
- Aromaticity and Stereochemistry
- Predicting Toxicity – Derek
Noncovalent Interactions in Catalysis

Kamran T Mahmudov  University of Lisbon, Portugal
Maximilian N Kopylovich  University of Lisbon, Portugal
M Fátima C Guedes da Silva  University of Lisbon, Portugal
Armando J L Pombeiro  University of Lisbon, Portugal

Synopsis
Noncovalent interactions (such as hydrogen bonds, π-π stacking and lipophilic interactions) often provide the spine of biomolecular and material structures, and can therefore play a key role in biological and catalytic processes. This book provides an overview of the role of different types of noncovalent interactions in both homogenous and heterogeneous catalysis. With chapters contributed by experts from around the world, it is a valuable resource for synthetic chemists who are interested in exploring and further developing noncovalent-interaction-assisted synthesis and catalysis.

Brief Contents
- Noncovalent Interactions in C–H Bond Functionalization
- Catalysis by Networks of Cooperative Hydrogen Bonds
- Secondary (Agostic Si-H/Electrostatic C-F) Interactions in Alkaline-Earth Based Catalysts
- Anion-Pi Catalysis
- Onium Ion-Assisted Organic Reactions Through Cation-Pi Interactions
- The Role of Noncovalent Interactions on the Efficiency of Dendrimers in Catalysis
- Noncovalent Interactions in Hydrogenation and Hydroformylation
- Soft Forces in Organic Synthesis by C-N Coupling Reactions

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