biopharmaceutical proteins, in which opportunities and challenges of this emerging field are discussed. A list of approved biopharmaceutical proteins is also given in the chapter. The other chapters of the book describe the complete methods and materials for producing therapeutic proteins from different potential sources.

This volume explains the protocols for production of therapeutic proteins from a variety of sources, including bacterial and yeast expression systems, insect and mammalian cells. It covers the purification of the resulting protein using both state-of-the-art and traditional methods, such as those sourced from plasma. Protocols for the characterization of the therapeutic proteins throughout the production process are described, along with viral inactivation and protein formulation methods and strategies.

The book contains both general methods and specific case studies that may be equally applicable to other systems or recombinant proteins. Every chapter contains a useful introduction describing theory and background to the method, which is then followed by materials required for the experimentation. The method section describes every step of the protocol and is cross-referenced to notes section, which would be highly useful for a researcher for successful experimentation.

This unique volume provides a comprehensive coverage for protein drug production from expression to formulation. The protocols are well illustrated with suitable figures, tables and recent references. In conclusion, this book is big contribution to the emerging and fascinating area of therapeutic proteins and will serve as an excellent source of practical information for protein scientists, chemists, biochemical/biomedical engineers, molecular biologists and biotechnologists.

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Jörg-Rüdiger Hill, Lalitha Subramanian and Amitesh Maiti, Molecular Modeling Techniques in Material Sciences, CRC Press, Taylor & Francis Group, Boca Raton, FL, USA, 2005 (xiii + 313 pp., £68.99, ISBN 0-8247-2419-4)

Three-dimensional structures, chemical processes and physiochemical properties of molecules and solids can be simulated and predicted by molecular modeling. Molecular modeling is a combination of chemistry techniques and graphics visualisation. Molecular modelling is becoming quite popular in pharmaceutical companies.

Molecular Modeling Techniques in Material Sciences opens with chapter one discussing scope of materials and describes the uses and applications of materials and their technological uses and details the general structure of molecular modeling programs, computer hardware and software related to molecular modelling. Chapter two discusses modeling of metal oxides and details electronic structure methods; cluster models, periodic calculations, and adsorption on metal oxides surfaces. Also detailing force field methods; surfaces and crystal morphology, defects and transport. The following chapter is concerned with microporous materials, zeolites which are mostly made up of silicon and oxygen are examples of microporous materials and have pores of molecular dimensions. The next chapter is about glass and discusses simulation of silica glass, alkali silicate glasses, aluminosilicate, borosilicate and other glasses, simulation of glass surface and diffusion and calculation of glass properties. Chapter five goes on to describe semiconductors and superconductors. Examples of semiconductors include elemental Si, Ge and compounds GaAs, GaP and ZnSe material. Semiconductors are crystals with narrow energy gaps between filled valence bands and empty conduction bands. Chapter six titled 'Nanomaterials', discusses different types of nanomaterials, synthesis methods and potential uses. Nanomaterials are used in light and electron emitting devices, structural materials, energy conversion and storage, catalysts, medical implants, drugs, medical imaging and drug delivery. Also discussed are nanowires and nanoribbons. The final chapter is titled 'Theoretical background', and explains quantum chemistry, covering the wave function and the Schrödinger equation, many particle systems, orbitals, the Hartree–Fock equations, the Roothaan–Hall method, basis sets, the direct self-consistent field (SCF) method, potential energy hypersuperfaces, forces, density functional theory, applications to solids-Bloch's theorem, tight binding theory, nearly-free-electron theory-plane waves and pseudopotentials, semi-empirical methods, the basis set superposition error and nuclear magnetic resonance spectra. Another topic explained is vibrational spectra, followed by statistical mechanics, which covers partition functions, calculation of thermodynamic functions. Molecular mechanics is explained and covers force fields, ion pair and shell model potentials, molecular mechanics force fields, comparison of ion pair and molecular mechanics force fields, force field parameterization and rule based force fields. Next detailed is combining quantum mechanics and force fields embedding, explaining mechanical embedding, electronic embedding, modeling reactions with embedding. This chapter also deals with Monte Carlo calculation, which can be used to study behaviour of molecules at a non-equilibrium configuration and prediction of macroscopic properties. This is followed by molecular dynamics calculations and grand canonical molecular dynamics.

This book provides an excellent introduction to molecular modeling techniques in materials sciences, and uses numerous equations, tables and illustrations to support the text.

Molecular Modeling Techniques in Material Sciences would be very useful to scientists researching or working on molecular modeling applications in industry.

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K. F. Gotlieb, A. Capelle (Eds.), Starch derivatization; Fascinating and unique industrial opportunities, Wageningen Academic Publishers, The Netherlands, 2005 (158pp., €45, ISBN 9076998604)

Starch has many uses in food and other industries such as paper and textile industry. It renewable and cheap. starch can be produced from plants like corn, tapioca and potato. *Starch derivatisation; Fascinating and unique industrial opportunities* discusses the derivatisation and application of polysaccharides and natural polymers.

Starch derivatization; Fascinating and unique industrial opportunities begins with focusing on the starch granule, where structural elements, surface layers, channels, pores and voids, surface substitution, hydrolysis, dried and never dried starch have all been discussed. Derivatisation in aqueous alcohols is discussed, the first part talks about native starch explaining carboxymethylation, cationisation, hydroxyethylation, esterification, cross-linking, hydrophobic starch, hydrolysis, oxidation, physical modification and enzymatic conversion. the second part is concerned with pre-cooked starches discussing chemical derivatisation, physical modification and reactions at low temperatures. Then granule swelling inhibitors in derivatisation and their side effects are explained. This is followed by information on amylose inclusion complexes, synergistic effects, carbohydrate oxidation with oxygen varieties on the Spengler and Pfannstiel reactions, spacers and the phosphate group in sugar and starch phosphates as nucleophiles Starch and cellulose acetoacetylation is described. Derivatisation with mixed anhydride and with alky sulfates is discussed. The reagent cyanamide which can be prepared by heating calcium carbide in nitrogen to temperatures over 1000 °C and can be extracted from calcium cyanamide with water is also discussed. Urea is used as a fertilizer, feed additive and in urea formaldehyde resins and is produced by heating liquid ammonia and carbon dioxide under pressure. Urea and starch derivatisation is explained. Starch and sugar derivatives with amidoxime and hydroxamic acids are detailed and ester migration in carbohydrates. Then the book details about ferulic acid esters, which are found in pectin, gallic acid esters, which are present in tannins and lactic acid esters. Super absorbents can be used in hygienic pads, moisturising soil, coating of seeds and in medical applications are also discussed in this book. Enzymes are used in starch derivatisation and the applications of hydrolases, transferases, lyases, oxidoreductases, isomerases and peroxidases are explained. Oligosaccharides, raffinose, lactosucrose and oligosaccharide phosphates are also discussed in this book.

Overall equations, diagrammatic explanations and graphs have been used supporting the text. This book would be useful to any persons studying starch derivatisation and persons working in industry researching in this field.

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Luc A. Cynober (Ed.), Metabolic and Therapeutic Aspects of Amino Acids in Clinical Nutrition, CRC Press LLC, Florida, USA, 2004 (755 pp., £, ISBN 0-8493-1382-1)

For a healthy human diet amino acids are essential, especially leucine, lysine and threonine. Amino Acids play major roles in protein synthesis, gluconeogenesis, ureagenesis and cell metabolism in which amino acids act as regulators. *Metabolic and Therapeutic Aspects of Amino Acids in Clinical Nutrition* is split into five parts and then further split into chapters and areas covered in the book include physiology and physiopathology (amino acid metabolism), amino acid metabolism in disease, requirements and supply of amino acids and supply of amino acids in diseases.

Metabolic and Therapeutic Aspects of Amino Acids in Clinical Nutrition begins with an introduction providing general information about research carried out on amino acids and gives an overview of some of the information found in the rest of the book.

Part one gives an introduction to metabolism of amino acids, and explains how the concentration of amino acids can be measured in biological fluids and tissues, such as the blood and urine, using ion exchange chromatography and reversed-phase HPLC methods. Details are given about the different approaches to studying amino acid metabolism. In which plasma amino acid concentrations and the significance of their variations, measurement of arteriovenous differences, use of