
Nanocosmetics

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Editors

Nanocosmetics

From Ideas to Products

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Preface

The cosmetics industry has long been at the forefront of applying nanotechnology into its products. As the nanotechnology revolution progresses, the possibilities offered by new technologies for modification of particles at the nanoscale to provide new properties and features are growing dramatically. This gives great opportunities to the cosmetics industry, but also challenges in assuring consumers that products are safe and in being able to demonstrate safety to regulatory bodies.

Nanoscience in Cosmetics aims at applying nano-enabled technologies to the development and production of innovative cosmetic products. More precisely, it involves the preparation and delivery of substances in the molecular and nanometer size range to the skin tissues, providing maximum efficacy and benefit while minimizing potential negative side effects. The importance of this emerging field of research and development relies on the fact that nanoparticles exhibit unique characteristics for protecting and repairing the skin.

This book deals with a broad range of topics, from the description of nano-sized materials, their formulation, production, characterization, delivery to the skin, to toxicity and safety. Research in this field requires a multidisciplinary approach, involving materials and chemical engineers, cellular biologists, pharmacists, and dermatologists.

The goal of this unique book is to present an overall picture of the use of nanotechnology in cosmetics. It is designed to be a reference textbook on the application of nanotechnology in the development of nanostructures for use in the development of innovative cosmetics products. Focus is placed on the description, research and manufacturing of candidate nanostructures, as well as their translation and use into marketable products by industry. We also review the most interesting and promising developments in this emerging but fast-developing field.

Part I gives an *introduction into cosmetics and into the nanocosmetics revolution*. They address the science behind cosmetics, provide an overview about the history, potential, challenges, and most recent developments in cosmetics and address the potential of the emerging nanotechnological applications in cosmetics science.

In Part II, *a systematic review of the various nanoparticles used in cosmetics* is provided with a description of currently used nanostructures (like inorganic nanoparticles, micelles and nanoemulsions, polymeric nanostructures, liposomes, lipid nanoparticles and nanocrystals), and their applications.

In Part III, *the characterization methods* of isolated particles as well as of particles in dermal formulations and of nanocosmetics on the skin are presented.

It also gives *a detailed overview of the preparation and manufacturing methods and associated issues*. Established processes as well as new exploratory methods are reviewed and concrete actual examples of utilization given. All relevant aspects are addressed including scale-up from laboratory to factory, and the requirements for occupational health in cosmetics production.

Part IV addresses *the governance of nanocosmetics*. Emphasis is laid on nanotoxicology and nanosafety aspects as well as regulatory issues for translation to the market of the most promising nanostructures.

Finally, the last chapter lays emphasis on *advances and potentials for use of nanomaterials in cosmetics*. Market prospects and commercialization aspects are also addressed, with special focus on the commercial translation and its bottlenecks, including the protection of intellectual property. Actual information about current commercialized products and market figures is also provided.

The chapters are written by leading researchers in cosmetics, chemistry, pharmacy, biology, chemistry, physics, engineering, and medicine, as well as law and social science. The authors come from a range of backgrounds including academia, industry, and national and international laboratories, from Europe, Israel, the USA, Brazil and India.

It is expected that this book will become a standard work for cosmetics scientists, pharmacists, dermatologists, and the cosmetics industry, but also a reference work for scientists, researchers, and students, as well as for agencies, government, and regulatory authorities.

This book aims to bring inspiration for scientists, new ideas for cosmetics developers, innovation in industry, and guidelines for toxicologists and finally will result in the development of guidelines for agencies and government authorities to establish safety rules in using this new promising technology. The book will also stimulate breakthroughs in the cosmetic sciences, leading to improved skin products for healthcare, skin protection, and beauty.

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