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Bio- and Nanosorbents from Natural Resources

 Springer

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Preface

Bio- and nanosorbents have been materials of interests for the researchers who believe in sustainable solutions. With rapidly growing industries using new and novel smart materials for commercial applications, the research is emphasized onto exploring ecofriendly materials to combat the challenge of pollution in all forms and to deliver the products with finest properties. Nanotechnology has played a huge role in the field of science, engineering, and technology, and the ideas have been out in the market for public utility.

Sorption and adsorption are an energy-efficient technique applicable for many important industrial and environmental applications. Adsorbents are designed based on its functional properties and feasibility to be used for large-scale processes and methodologies. Many scientific techniques use adsorption as a principle technique such as chromatography used for separation systems, sensing devices those are primarily made of composite or nanocomposite adsorbing the biofluids and providing accurate response, the material adsorbing light from visible spectrum to be used for electronic and optical devices, catalytic conversion of the petroleum products using heterogeneous catalysts, the filters used for water treatment use adsorption technique, bacterial filtration. These were few well-known examples where bio- and nanoadsorbents have strong foundation and its utilization is visible in our daily lives.

As mentioned above, the applicability of adsorbents is unique and diverse. However, the book is consolidated on the application of these sorbents in nanosize derived from natural sources to be used for decontamination of organic and inorganic pollutants. There are eight chapters dealing with the theme of various adsorbents used for wastewater treatment. Chapter “[Biosorbents from Agricultural By-products: Updates After 2000s](#)” provides a review on the update after the year 2000 on the biosorbents derived from agriculture by-products. Chapter “[Carbon Nanoadsorbents for Removal of Organic Contaminants from Water](#)” deals with the carbon nanosorbents used for the removal of organic contaminants. Chapter “[Lignin and Chitosan-Based Materials for Dye and Metal Ion Remediation in Aqueous Systems](#)” discusses the lignin which is cementing agent of plant fibers and chitosan-based nanocomposite material for the removal of organic dye and heavy

metal ions. Cationic polyelectrolytes have been versatile materials for environmental cleanup which has dealt in Chapter “[Cationic Nanosorbents Biopolymers: Versatile Materials for Environmental Cleanup](#),” whereas Chapter “[Alginate-Based Nanosorbents for Water Remediation](#)” provides information about alginate-based nanosorbents for water remediation. Chapter “[Chitosan-Based Natural Biosorbents: Novel Search for Water and Wastewater Desalination and Heavy Metal Detoxification](#)” exclusively talks about chitosan polymer and its application for desalination and detoxification. Chapter “[Application of Biomaterials for Elimination of Damaging Contaminants from Aqueous Media](#)” explains the application of biological adsorbent material for removal of inorganic contaminants from aqueous media. Chapter “[Synthesis and Application of Silica Nanoparticles-Based Biohybrid Sorbents](#)” deals with nanoadsorbents for the removal of hexavalent chromium from water and wastewater.

The present book will benefit the researchers working in the area of nanoadsorbents and biosorbents used for wastewater research. These adsorbents have been utilized in its pristine form, as well as developed as polymer blends, composites, nanocomposites, and bionanocomposites. The unique properties of these sorbents lie in the fact with respect to adsorption efficiency and environmental sustainability that has been a talk of the research world and environmental protection agencies.

The book is an inspiration to the researchers working in the field of environmental protection, water engineers, and environmental managers and to all the young researchers who wish to develop their career in this field. The book presents the recent progress and future prospects that can be made in the area of bio- and nanosorbents.

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