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Pollutants; 3.1 Introduction; 3.2 Experimental; 3.3 Results and Discussion; 3.4 Conclusions; Acknowledgements; References; Chapter 4: Carbon Nanomaterials for Chromium (VI) Removal from Aqueous Solution
4.1 Introduction4.2 Carbon Nanomaterials for Heavy Metal Removal; 4.3 Latest Progress in Nanocarbon Materials for Cr(VI) Treatment; 4.4 Summary; Acknowledgement; References; Chapter 5: Nano-Carbons from Pollutant Soot: A Cleaner Approach toward Clean Environment; 5.1 Introduction; 5.2 Separation of Nano-carbon from Pollutant BC; 5.3 Functionalization of Nano-Carbons Isolated from Pollutant BC; 5.4 Nano-Carbons from Pollutant Soot for Wastewater Treatment; 5.5 Conclusion; Acknowledgments; References; Chapter 6: First-Principles Computational Design of Graphene for Gas Detection
6.1 Introduction6.2 Computational Methodology; 6.3 Nitrogen Doping and Nitrogen Vacancy Complexes in Graphene; 6.4 Molecular Gas Adsorptions; 6.5 Summary; Acknowledgments; References; Part 2: Synthetic Nanomaterials; Chapter 7: Advanced Material for Pharmaceutical Removal from Wastewater; 7.1 Introduction; 7.2 Advanced Materials in the Removal of Pharmaceuticals from Wastewater; 7.3 Activated Carbon (AC); 7.4 Modified Carbon Nanotubes (CNTs); 7.5 Modified Polysaccharide Matrices; 7.6 Metal Organic Framework (MOF); 7.7 Reactive Composites; 7.8 TiO2-Coated Adsorbents
7.9 Adsorption by Zeolite and Polymer Composites7.10 Adsorption by Clay; 7.11 Conventional Technologies for the Removal of PPCPs in WWTP; 7.12 Membrane Filtration; 7.13 Ozonation and Advanced Oxidation Process (AOP); 7.14 Electro-oxidation; 7.15 Adsorption by Coagulation and Sedimentation; 7.16 Conclusion; References; Chapter 8: Flocculation Performances of Polymers and Nanomaterials for the Treatment of Industrial Wastewaters; 8.1 General Introduction; 8.2 Conventional Treatment of Water with Inorganic Coagulants
8.3 Development of Polymer-Based Coagulants and Mechanisms of Turbidity Removal

Sommario/riassunto

"Smart materials are used to develop more cost-effective and high-performance water treatment systems as well as instant and continuous ways to monitor water quality. Smart materials in water research have been extensively utilized for the treatment, remediation, and pollution prevention. Smart materials can maintain the long term water quality, availability and viability of water resource. Thus, water via smart materials can be reused, recycled, desalinized and also it can detect the biological and chemical contamination whether the source is from municipal, industrial or man-made waste. The 15 state-of-the-art review chapters contained in this book cover the recent advancements in the area of waste water, as well as the prospects about the future research and development of smart materials for the waste water applications in the municipal, industrial and manmade waste areas. Treatment techniques (nanofiltration, ultrafiltration, reverse osmosis, adsorption and nano-reactive membranes) are also covered in-depth. The chapters are divided into three groups: The first section includes the various carbon nanomaterials (such as carbon nanotubes, mixed oxides) with a focus on use of carbon at nanoscale applied for waste water research. The second section focuses on synthetic nanomaterials for pollutants removal. The third section highlights the bio-polymeric nanomaterials where the authors have used the natural polymers matrices in a composite and nanocomposite material for waste treatment"--