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Nota di contenuto	Introduction to MXenes -- Structural design, properties and synthesis of original MXenes -- Structural design and synthesis of elemental doped MXenes and MXenes based Composites -- Functionalized MXene based polymer composites -- Fabrication and structural design of MXene based hydrogels -- Emerging trends for supercapacitors -- Recent advancement in Lithium ion batteries -- MXene based Sodium ion batteries -- Design and applications of MXene based Li-S ion batteries -- Functionalized MXene films for energy storage applications -- Developments in MXene composites for thermal energy storage -- Nanostructured MXenes for hydrogen storage for energy applications -- Generation and conversion of Energy through MXene based electrodes -- Diverse applications of MXene composites for electrochemical energy storage -- Potential of Nanoengineered MXenes in photocatalysis -- Insight into promising role of MXene composites in electrocatalysis -- Promising applications of MXenes in optoelectronic device -- Efficacy of MXene based materials in Removal of gases --

Environmental remediation of heavy metals through MXene composites
-- Advanced approach of MXene based materials in Removal of radionuclides -- Potential role of MXene based materials in mitigation of organic contaminants -- Functionalized MXene conjugates in removal of Pharmaceutical based pollutants -- Potential mitigation of dyes through MXene composites -- Applications of MXene based materials in gas sensing -- Recent advances in MXene based electrochemical sensors pollutants -- Biosensing applications of MXene composites -- Diverse applications of MXene composites in optical sensing -- Miscellaneous Applications of other MXene based sensors -- Toxicology, stability, and environmental impacts of MXenes -- Challenges and future prospective of MXenes.

Sommario/riassunto

This book covers the various aspects of MXenes nanomaterials and its composites from the fabrication to the potential applications in energy devices, sensors, and environmental remediation. MXenes are two-dimensional (2D) transition metal carbides and nitrides which contains novel combination of properties including great conductivity and mechanical, thermal features of transition metal carbide and nitrides. In addition, MXenes nanomaterials possess high surface area, novel morphology, and layered structure and the functionalized of its surfaces gives it excellent hydrophilic characteristics and high absorption of electromagnetic radiations making them versatile materials for various applications. The beginning part of the book gives an in-depth literature covering the fundamental principles, fabrication, self-assembling strategies of nano-engineered MXenes, and their composites materials. The later chapters describe the chemical functionalization of MXenes nanomaterials for diversified applications such as electromagnetic shielding, energy storage devices (super capacitors, lithium ion batteries, CO₂ capture, optical switching, transistors), photo catalysis, drug delivery, implants, tissue engineering, water purification, and sensing applications. It demonstrates that MXene-based advanced architectures promote continuous innovations and provide driving force in different fields particularly in environmental remediation and energy storage devices. This book is essential reading for all chemists, biologists, physicists, and environmental scientists working in the field of nanotechnology, energy, and environmental chemistry. It helps academics and professionals to polish their knowledge with the latest described data. It also helps professionals in developing innovative technologies by keeping in mind the applications of functionalized nanostructured MXenes.