EDITORIAL

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Nanotechnology has increasingly attracted attention as a useful approach to assist in achieving environmental sustainability and water resource management. The current issue proves the importance of evaluating the efficiency of nanomaterials alongside their safety, recyclability, and feasibility of the scale-up process.

A pivotal aspect of this issue is the application of various nanomaterials synthesized via environmentally friendly methods. Using of biologically and naturally occurring substances, such as rosemary essential oil, neem leaf extract, and *Sesuvium portulacastrum* extract represents efforts for eliminating use of hazardous precursors. In the following, this issue covers the incorporation of nanotechnology into water purification, environmental remediation, and biomedical investigations. These evaluations include the antimicrobial, preliminary cytotoxic, reduction of heavy metals, and degradation residual drugs/dyes. Remarkably, the biological and ecotoxicological risks of engineered Ag, Au, and Cu nanoparticles have been reviewed. This manuscript highlights that despite using a green precursor, environmental fate assessment remains necessary for the further deployment of nanomaterials.

Another review paper focuses on the critical study of the widespread application and environmental paradigms of nanomaterials. This article reviews the circular economy for wastewater recovery. Furthermore, its opportunities and limitations such as costs, market uncertainties, and regulations are explored. In conclusion, sustainable nanotechnology requires interdisciplinary collaboration between chemistry, toxicology, and materials and environmental sciences. Further developments of nanoparticles will depend on laboratory tests, safety assessments, and evaluations under real conditions.

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Editor-in-Chief

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