عنوان مقاله:

Title of paper: Investigating new methods of wastewater treatment and nanotechnology

محل انتشار:

اولین کنگره بین المللی علوم، مهندسی و فن آوری های نو (سال: 1401)

تعداد صفحات اصل مقاله: 9

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خلاصه مقاله:

Based on solving the challenge of water crisis in the era of scarcity of water resources, effective wastewater treatment is the main prerequisite of a growing economy. It is very important to develop and implement advanced wastewater treatment technologies with high efficiency and low capital requirements. Among various treatments, recent advanced processes in nanomaterials science have attracted the attention of scientists. However, limited collective knowledge is available in this area. In particular, marine-based biomaterials, for example, chitin/chitosan, seaweed and seaweed-based polysaccharides (agars, alginate, cellulose, carrageenan) are abundant, eco-friendly and renewable biomaterials that are suitable solutions for environmental pollution in are considered Over the past few decades, various studies have focused on marine and seaweed-polysaccharide-based composites for water treatment due to their renewability and sustainability. The current article examines the potential advances in nanotechnology in wastewater treatment. It also reviews and discusses the use of different classes of nanomaterials for wastewater treatment processes, which includes four main classes. First, nano adsorbents such as activated carbon, carbon nanotubes, graphene, manganese oxide, zinc oxide, titanium oxide, magnesium oxide and iron oxides are usually used to remove heavy metals from wastewater. Second, nanocatalysts such as photocatalysts, electrocatalysts, Fenton-based catalysts, and chemical oxidants have shown potential to remove organic and inorganic pollutants. Third, nanomembranes have been used for the effective removal of dyes, heavy metals, and precipitants using carbon nanotube membranes, electrospun nanofibers, and hybrid nanomembranes. Finally, the integration of nanotechnology with biological processes such as algal membrane bioreactor, anaerobic digestion and microbial fuel cell is discussed with regard to its potential for wastewater treatment. Also, the challenges in implementing functional biomaterials developed in advanced water treatment technologies and Future prospects are discussed.

کلمات کلیدی:

Water purification, nano technology, nano absorbents, nano catalysts, nano membranes

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