

Potential nanomaterials application in wastewater treatment : Physical, chemical and biological approaches

Syahirah Kamarudin, Nur; Jusoh, Rohayu; Dina Setiabudi, Herma; Fateha Sukor, Nuramira; Haslinda Shariffuddin, Jun

^a Faculty of Chemical and Process Engineering Technology, Universiti Malaysia Pahang, Gambang, Kuantan, Pahang, 26300, Malaysia

ABSTRACT

The essential challenges in the 21st century are providing clean and affordable water to meet human needs that are mainly resulting from the rapidly increasing population, depleting water resources, and climate change. The development and implementation of advanced wastewater treatment technologies with high efficiency and low capital requirement is important in order to minimize the negative impacts of wastes on the environment. Nanotechnology offers a great potential for removal of pollutants and germs from wastewater. High surface-to-volume ratio and photocatalytic properties of these nanomaterials introduced them as highly potent option for removal of heavy metal ions and organic dyes. This paper critically reviewed the application of nanomaterials as nano-adsorbent, nano-catalyst and nano-membrane in wastewater treatment. This review also provided an insight into a detailed description and application of these nanomaterials in chemical, physical and biological treatment for removal of pollutant from wastewater. From the current review, it is evident that the nanomaterials possess exclusive properties, which can contribute to the high efficacy in treating high levels of different pollutants.

KEYWORDS

Membrane; Nanofiltration; Nanomaterials; Nanosorbent; Photocatalysis; Wastewater treatment

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