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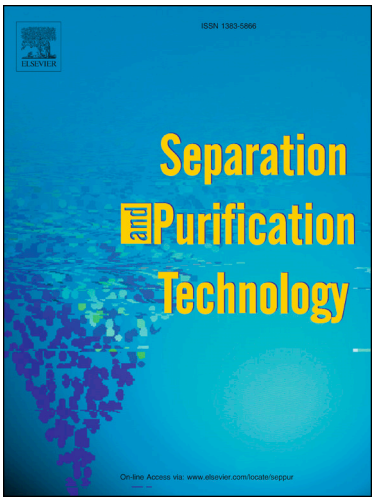

Review

Nanoparticles in household level water treatment: An overview

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Nanoparticles in household level water treatment: An overview

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Abstract

Providing safe drinking water is a great challenge for both the developing and the developed world. Increasing demand and source water quality deterioration has led to the exploration of new technological innovations for better water management. Nanotechnology holds great promise in ensuring safe drinking water through designing innovative centralised and decentralised (household-level) water treatment systems. The paper provides an overview of recent advances in nanotechnologies for (household level) water treatment processes, such as its use as nanoadsorbents, photocatalysts, microbial disinfectants and in membranes. Extensive implementation of nanotechnology for water treatment would require overcoming the high cost of the nanomaterials by enabling their reuse and regeneration. This would also ensure minimising potential environmental exposure. Potential advances in nanotechnology must go hand in hand with environmental health to alleviate any undesirable consequences to humans.

Keywords: Nanoparticles, water treatment, household level

1. Introduction

Safe drinking water is considered a vital indicator of a country`s development and according to recent reports, about 663 million people around the world do not have access to safe drinking water (WHO/UNICEF, 2015). Pollution and indiscriminate exploitation of surface water over the years has led to dependence on groundwater for potable purposes by over 50% of the global population (Ayoob et al., 2008). However, groundwater is a haven for several naturally occurring and anthropogenic ions such as fluoride, arsenic, lead, chromium, nitrate, selenium, chloride, heavy metals as well as radioactive materials which greatly compromise groundwater quality leading to health problems (Jadhav et al., 2015). In addition, pathogens such as *adenovirus, hepatitis A, rotavirus* to name a few, are commonly found in both surface and groundwater and must be effectively inactivated to provide safe water (Hamza et al., 2009). Drinking water safety is judged by national standard standards or international