

Recent Trends in Nanotechnology for Water Purification

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The world is currently facing formidable challenge in meeting rising demands of potable water as the available supplies of freshwater are decreasing due to extended droughts, population growth, decline in water quality and increasing water demands. To alleviate these problems, water purification technologies are being updated. These technologies need to be affordable, durable and effective than current options for the removal of contaminants from water, either in-situ or in water purification systems. It is in this context that nano-enabled technologies are being considered. Recent years have witnessed impressive breakthroughs towards practical application of nanostructured materials in the field of water purification. Advances in nanoscale science and engineering suggest that many of the current problems involving water quality could be addressed using nanosorbents, nanoparticles and nanocomposite membranes. An overview on the use of nanotechnology in water purification has been presented. The recent advances on the development of novel nanoscale materials and processes for treatment of surface/ground water contaminated by toxic metal ions, organic and inorganic solutes, bacteria and viruses are highlighted. It is emphasized that the nanoscale structures need to be arranged into well-defined configurations in order to build integrated systems with high flux and high selectivity. Nano-filtration for water treatment has also been discussed. Challenges involved with respect to product development and commercialization of R&D work have been deliberated. It is estimated that nanotechnology and biotechnology has potential to create a trillion dollar industry by 2030.