

Utilizing bulk nanostructured materials for lost-cost water treatment: Prospects and challenges

Ibrahim Dauda Muhammad¹ and Abdullahi Mohammed Evuti²

¹Mechanical Engineering Department, University of Abuja, Nigeria

²Chemical Engineering Department, University of Abuja, Nigeria

Delivering clean and cheap water to meet basic human demands is a far-reaching challenge of the current era. The task of water supply is striving to keep up with the rapid increasing demand, which is worsened by water quality deterioration, population development, global climate change and other factors. The need for technological innovation to enable integrated and affordable water treatment for the majority of human populace cannot be overemphasized. Nanotechnology possesses immense prospective in improving water treatment efficiency as well as to enhance water supply via safe use of unconventional water sources. In this paper, current methods for water treatment using nanotechnologies are reviewed with emphasis on nanofiltration in order to achieve the desired goals at minimal cost. The discussion comprises of the nanomaterials, properties and mechanisms that enable the applications, advantages and limitations as compared to existing processes, and barriers and research needs for commercialization. Case studies of specific products for water treatment based on nanotechnology are highlighted in order outline the opportunities and limitations to further capitalize on these unique properties for sustainable water management at low cost.

Biography:

Ibrahim Dauda Muhammad completed his PhD from Universiti Teknologi PETRONAS, Malaysia with research conducted on simulating the mechanical properties of nanotubes using multiscale computational techniques. Dr. Ibrahim D. Muhammad is currently a Senior Lecturer with the Department of Mechanical Engineering, University of Abuja, Nigeria. He has published more than 7 peer reviewed articles in several Journals and has also reviewed papers for several Journals. Dr. Muhammad is a member of several professional bodies such as the Nigerian Society of Engineers, Council for the Regulation of Engineering in Nigeria, American Society of Mechanical Engineers and The International Association for Computational Mechanics.