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## Heavy metals removal using micro and nano carbon adsorbents: A comparative study

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Water is the new oil of the 21<sup>st</sup> Century and is becoming more valuable due to the increased consumption and demand. Safe drinking water is one of mankind's most basic needs. It is generally defined as water that does not pose any health risk to humans. The World Health Organization (WHO) defines safe drinking water as water that has chemical, microbial and physical characteristics that comply with both WHO guidelines for drinking water quality and the respective country's drinking water standard. Good quality water (i.e., water free of contaminants) is essential to human health and a critical feedstock in a variety of key industries including oil and gas, petrochemicals, pharmaceuticals and food. The available supplies of water are decreasing due to (1) low precipitation, (2) increased population growth, (3) more stringent health based regulations, and (4) competing demands from a variety of user's e.g., industrial, agricultural and urban development. Consequently, water scientists and engineers are seeking alternative sources of water. Widespread concern over the toxicity and the environmental impact of the ionic metals, cationic compounds and microorganisms have led to extensive research aiming to develop effective technologies for the removal of these potentially hazardous substances from effluents and industrial wastewater. Adsorption is one of the attractive techniques for removal ionic metals, cationic compounds and microorganisms due to its low cost and easy regeneration. For a couple of years, large numbers of researchers focused on applications of carbon based materials for the removal of the contaminations from water. Different types of carbon based materials from micron size such activated carbon, charcoal and carbon fly ash to nanocarbon such as carbon nanotubes, carbon nanofibers and graphene nanoparticles were used for water treatment. In this speech, a comparative study for the adsorption application of micro and nanocarbon materials will be presented.

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