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Carbon nanotubes doped with metal oxide nanoparticles as new materials for oil removal

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Water with oil contamination is one of the challenges in water resources management. Multi-walled carbon nanotubes (MWCNTs) have caught a lot of attention as a new type of adsorbents due to their exceptional capacity for oil adsorption. In this work, we report on the synthesis and laboratory evaluation of multiwall carbon nanotubes decorated with different loadings of Fe₂O₃ and Al₂O₃ nanoparticles for oil-water separation. Pristine and modified CNTs were characterized by scanning electron microscopy (SEM), Transmission electron microscopy (TEM), The Brunauer, Emmett and Teller (BET) technique, X-ray Diffraction (XRD), and thermogravimetric analysis (TGA). The effect of adsorbent dosage, contact time, and agitation speed were examined on the oil spilling efficiency using batch adsorption experiments. The sorption capacities of modified CNTs were found to be greater than 7 g/g for gasoline oil. The modified CNTs due to their hydrophobic nature do not absorb water and has superior selectivity for organic compounds such as oil and organic solvents. These interesting materials show practical solution for water treatment especially in oil and gas industries.

Biography

Ahmad Kayvani Fard is pursuing his PhD in Hamad Bin Khalifa University (HBKU) and is a Research Associate at Qatar Environmental & Energy Research Institute (QEERI) School of Science and Engineering. He has published more than 5 papers in reputed journals and his main focus is on water desalination and water treatment using membrane and nano materials.

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