

## Metal oxides nano-size and polymers added MWCNTs for hydrocarbons and dyes removal from water

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The increasing population around the world increases the demand for fossil fuels which led to an increased probability of oil shipping accidents and oil spill possibilities. Discharge of byproducts of dyes production industries into water sources, make the biggest challenges for researchers to produce cost-effective processes and environmentally friendly water treatment. In this work, different polymers and metal oxides nanosize were added to MWCNTs and applied for hydrocarbons (kerosene cut and toluene) and dye removal from water. Firstly MWCNTs were oxidized using strong acids. Then different polymers: polyethylene (PE) and poly-N-isopropylacrylamide-co-butylacrylate (P-NIPAM) were added to Fe/MWCNTs for kerosene and toluene removal from water. The physio-sonication method was used for the preparation of nanocomposites. In another hand, our group also modified other nano sorbents (metal oxides nanocomposites like V2O5, CeO2, and their nanocomposites were added to MWCNTs for kerosene and dyes removal from water).

In order to confirm the adsorption behavior of the kerosene/toluene, three kinetic models were applied including the pseudo-first-order, the pseudo-second-order, and the Intra particle diffusion model is commonly known as the weber morris kinetic model was applied. While Langmuir and Freundlich's isotherm models were used to calculate the isotherm constants. The fresh and modified MWCNTs were characterized using XRD, SEM, TEM, EDX, FTIR, Raman, TGA and BET. Polymers nanocomposites and metal oxides nano-size modified MWCNTs were greatly increased the removal efficiency and sorption capacity for parent MWCNTs towards hydrocarbons and dyes removal from water.

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### Recent Publications

1. Abdullah TA, Juzsakova T, Rasheed RT, Mallah MA, Salman AD, Cuong LP, Jakab M, Zsirka B, Kulacz K, Sebestyén (2022), V. V2O5, CeO2 and Their MWCNTs Nanocomposites Modified for the Removal of Kerosene from Water. *Nanomaterials*; 12(2):189. <https://doi.org/10.3390/nano12020189>
2. Abdullah, T. A., Juzsakova, T., Rasheed, R. T., Salman, A. D., Adeliikhah, M., & Cretescu, I. (2021). V2O5 Nanoparticles for Dyes Removal from Water. <http://dx.doi.org/10.19261/cjm.2021.911>
3. Abdullah, T. A., Juzsakova, T., Mansoor, H., Salman, A. D., Rasheed, R. T., Hafad, S. A., & Nguyen, D. D. (2022). Polyethylene over magnetite-multiwalled carbon nanotubes for kerosene removal from water. *Chemosphere*, 287, 132310. <https://doi.org/10.1016/j.chemosphere.2022.132310>

# 25<sup>th</sup> International Conference on ADVANCED NANOSCIENCE AND NANOTECHNOLOGY

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chemosphere.2021.132310

4. Abdullah, Thamer A., Tatjana Juzsakova, Rashed T. Rasheed, Ali D. Salman, Viktor Sebestyen, Endre Domokos, Brindusa Sluser, and Igor Cretescu. (2021). "Polystyrene-Fe<sub>3</sub>O<sub>4</sub>-MWCNTs Nanocomposites for Toluene Removal from Water" *Materials* 14, no. 19: 5503. <https://doi.org/10.3390/ma14195503>

## Biography

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