

## Oil spill removal from water by mussel-inspired polyethylenimine-functionalized activated carbon derived from date palm waste

Adewale Giwa<sup>1\*</sup>, Hanifa Taher<sup>2</sup>

<sup>1</sup> Department of Chemical Engineering Abu Dhabi, United Arab

<sup>2</sup> Khalifa University of Science and Technology, Abu Dhabi, United Arab Emirates

### Abstract

Activated carbon was prepared from date palm leaves, modified with mussel-inspired polydopamine and cationic polyethylenimine by dip coating, and employed for the sorption/dispersion of crude oil in simulated seawater. The activated carbon was prepared from ZnCl<sub>2</sub> activating agent using two impregnation ratios, i.e. 1:2 and 1:4. The pristine (unmodified activated carbon) prepared from 1:4 impregnation ratio showed the highest crude oil sorption efficiency of 53% but no crude oil dispersion. Modification of the activated carbon with 10% PDA/PEI increased the dispersion efficiency to 61% while still achieving a sorption efficiency of 30%. The dual sorption-dispersion property of this activated carbon was achieved through the abundant nucleophilic N-H chains in the modifier, which altered the morphology and pore structure of the activated carbon, improved its amphiphilicity, and ensured covalent C-N linkages with the activated carbon. However, a further increase in the % of the modifier from 10% to 20% resulted in a decrease in both sorption and dispersion efficiencies due to salting-in effect. Samples were characterized using Environmental Scanning Electron microscopy, Raman Spectroscopy, Infra-Red IR Attenuated Total Reflectance (ATR) spectra analysis, and Energy Dispersive X-Ray Spectroscopy. The modified activated carbon showed better sorption/dispersion characteristics compared to a commercial activated carbon. This study presents the potential for the formation of pickering emulsions of crude oil in saline water using activated carbon derived from date palm waste.



### Biography:

Dr. Adewale Giwa is a researcher at Khalifa University of Science and Technology, Abu Dhabi, United Arab Emirates. He has co-authored over 50 publications and reviewed scientific articles for many journals.

[26th International Conference on Advanced Materials, Nanotechnology and Engineering](#) June 22-23, 2020

### Abstract Citation:

Dr. Adewale Giwa, Oil spill removal from water by mussel-inspired polyethylenimine-functionalized activated carbon derived from date palm waste 2020, 26th International Conference on Advanced Materials, Nanotechnology and Engineering June 22-23, 2020

<https://advancedmaterials.conferenceseries.com/speaker/2020/dr-adewale-giwa-dr-adewale-giwa-is-a-researcher-at-khalifa-university-of-science-and-technology-abu-dhabi-united-arab-emirates>

