

5th International Conference on **Pollution Control and Sustainable Environment**
&
10th Edition of International Conference on **Water: Pollution, Treatment & Research**

March 14-16, 2019 London, UK

Removal of crude oil from aqueous medium using modified activated carbon by phosphoric acid

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Petroleum products and their derivatives are considered as major source of pollution in the environment that causes harm not only to the atmosphere but as well as the wildlife. Due to exploration of oil, transportation as well as production of petroleum products, the oil spill is limitless. Meanwhile, history showed us that lack of safety measures and integrity can cause oil spills. For instance the Gulf of Mexico in 2010 is still the most catastrophic event of crude oil spill in the sea which took few days to remove the oil. Petroleum oil spills has a devastating affect towards the environment in terms of pollution on reefs, sand beaches and economy as well as the public health. In order to remove oil spills, methods such as mechanical, biological, chemical and adsorbents have been developed from previous researches. The objective of this study was to modify the activated carbon (AC) by impregnation method with 80% w/v phosphoric acid (H_3PO_4) solution. Fourier Transform Infrared Spectroscopy (FTIR) was used to find the functional groups in the modified and unmodified AC. After impregnation, this study aimed to study the effect of temperature, dosage of adsorbents and contact time towards the adsorption process as well as isotherm and kinetic studies. The results show that the modified activated carbon (MAC) oil sorption capacity is higher than unmodified AC in every parameter tested. The best fit to describe the kinetic study is the pseudo-first-order and meanwhile for adsorption isotherm is Freundlich most suited to describe the sorption equilibrium of crude oil on AC and MAC.

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