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**Adsorption of polycyclic aromatic hydrocarbons onto activated carbon from non-aqueous media: 1. the influence of the organic solvent polarity**

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**Abstract**

Polycyclic aromatic hydrocarbons (PAHs) can be formed easily during the refinery processes of crude petroleum. Their accumulation poses serious operating problems and their removal is of great importance. In this investigation we tested the ability of activated carbon to remove a number of the PAHs compounds from mixtures of organics solvents, with different chemicals structures and polarities. Batch adsorption tests were used to investigate the effect of chemical structures and polarities of solvents on the adsorption of naphthalene, anthracene, and pyrene on activated carbon. Our investigation revealed that aromatic solvents have high affinity for activated carbon and therefore, inhibit PAHs adsorption, while polar solvents have low affinity for activated carbon and consequently the adsorbent sites are more available for the PAHs molecules. This behavior can be explained by the fact that the PAHs and benzene molecules are able to form  $\pi$ - $\pi$  complex between  $\pi$ - electrons of benzene rings and active sites on an activated carbon surface. An increase in the molecular weight of aliphatic solvents such as hexane and heptane has little effect on adsorption of PAHs to activated carbon. However, cyclic hydrocarbon solvents such as cyclohexane increase the adsorption of small PAHs and decrease the adsorption of heavier PAHs molecules, probably as a result of differences in solubilities.

**Author Keywords**

Activated carbon; Equilibrium isotherms; Non-aqueous media; PAHs adsorption

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