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Removal of Sudan IV from a simulated biphasic oily wastewater by using lipophilic carbon adsorbents

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Abstract

Several chemically and thermally modified activated carbons were tested in the adsorption of a lipophilic pollutant (Sudan IV) contained in biphasic oil-water mixture mimicking petroleum refinery effluents. The effect of different parameters on the adsorption performance has been assessed, such as the absence of water, particle size of the carbon material and the respective chemical and thermal modifications, initial concentration of pollutant, water/oil volume ratio, nature of the organic phase (cyclohexane, n-hexane or n-hexadecane) and the presence of an emulsifier (sodium dodecyl sulphate). Lipophilicity of the adsorbent was found to be a key parameter in the purification of the organic phase. Successive treatments of the parent commercial activated carbon Norit ROX 0.8, namely with nitric acid, urea, followed by a thermal treatment at 800 °C under inert atmosphere, developed the highest adsorption capacity ($q_e = 200 \text{ mg}\cdot\text{g}^{-1}$) in the base material. A load of $2.5 \text{ g}\cdot\text{L}^{-1}$ of this modified carbon was

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