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TOLUENE AND NAPHTHALENE SORPTION BY PARTIALLY EXCHANGED ORGANOCLAYS

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The BTEX fraction of the total volatile hydrocarbons is primarily responsible for most of the total toxicity in gasoline-contaminated ground water [1-2-3]. Polycyclic aromatic hydrocarbons (PAHs) are primarily introduced into the environment by the incomplete combustion of fossil fuels and fuel spill incidents [4] Toluene, which exhibits intermediate physical and chemical characteristics of the components of BTEX [5] and naphthalene, which represents PAHs and diesel components, were selected for sorption runs. A batch study was conducted using organoclays prepared from a commercial bentonite by replacing the natural exchangeable cations of the clay by DMDEA (dimethyldisteraylammonium) and HDTMA (hexadecyltrimethylammonium) ions. The sorption of the toluene and naphthalene was measured as a function of total organic content of the quaternary ammonium cation loading at 40 and 75 % clay's cation-exchange capacity. The organoclays were characterized by X-Ray Diffraction, CHN Analysis, Differential Thermal Analysis, Thermogravimetry and Derivative Thermogravimetry [6-7]. Sorption data were tested by two models: Freundlich and linear, the first of which showed the best correlation coefficient for the experimental data. Sorption of toluene and naphthalene by original natural bentonite was negligible. The higher was the organic cation content the higher was the sorption of the toluene by the HDTMA and or DMDEA bentonites. The opposite was observed for the sorption of naphthalene, which adsorption coefficient was much higher than that of toluene independently of the type of organic cation. Positive log K_{om}/K_{ow} values for toluene and naphthalene sorption indicated there was a greater retention of these organic pollutants by organoclays than octanol.

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