

Sorption of Pentachlorophenol to a Surfactant Modified Montmorillonite.

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Pentachlorophenol (PCP) is a hydrophobic ionizable organic compound (HIOC). With a pKa of ≈ 4.7 , it can exist in the environment as both a neutral molecule and a

hydrophobic anion. The sorption of these two forms should be different. This study investigated the sorption of PCP to a montmorillonite clay (SWy-1) that was modified with a quaternary amine, hexadecyltrimethylammonium bromide (HDTMA). It has been demonstrated that modifying clays by the addition of surfactants such as HDTMA can enhance the sorption of hydrophobic organic compounds. Several researchers have suggested that modified clays could be used as a sorbent for the selective removal of organic contaminants from the aqueous phase. The research presented here is part of a continuing project to investigate the use and feasibility of modified clays as an option for water treatment and environmental remediation. The effect of pH, ionic strength and HDTMA clay loading levels on sorption isotherms was investigated. Sorption appeared to be directly related to the pH and ionic strength and to the loading level at a particular pH and ionic strength. Sorption was linear and greater when the pH was less than the pKa of PCP. It was nonlinear when the pH exceeded the pKa of PCP. In addition, when the pH was greater than the pKa sorption was directly related to the ionic strength of the solution.

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