Application of talc for removal of malachite green

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Talc is a mineral composed of hydrated magnesium silicate with the chemical formula $H_2Mg_3(SiO_3)_4$ or $Mg_3Si_4O_{10}(OH)_2$. In loose form, it is the widely used substance known as talcum powder. It has a perfect basal cleavage, and the folia are non-elastic, although slightly flexible. It has a specific gravity of 2.5-2.8, a clear or dusty luster, and is translucent to opaque. Talc is not soluble in water, but it is slightly soluble in dilute mineral acids. In this study, batch sorption experiments were carried out to remove malachite green(MG) from aqueous solution using talc. MG primarily used as a dye was classified a Class II Health Hazard because of its toxicity. The operating variables studied were solution pH, temperature, contact time and initial MG concentration. Adsorption experiments showed that the process was strongly pH-dependent. Kinetic studies showed that the process reached equilibrium in 120 min. The data were fitted using the pseudo-first and second order kinetic equations and intraparticle diffusion model. In order to determine the adsorption capacity, the sorption data were analyzed using linear form of Langmuir and Freundlich equation.