ADSORPTION OF THE HERBICIDE FLUOMETURON ON PERIODIC MESOPOROUS ORGANOSILICAS.

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Widespread use of pesticides increases the levels of their residues in soils and ground waters and so this becomes a current environmental problem, particularly related to drinking water quality. Consequently, there are many efforts in developing new materials to be used on water decontamination.

Periodic mesoporous organosilicas have unique properties to be used as adsorbents of organic molecules in virtue of their high surface area and narrow mesopore distribution as well as their bridges of organic nature which can interact with the organic pollutants. The main purpose of this paper is to examine the potential use of these materials with ethylene and phenylene bridges to reduce the environmentally harmful effects of the herbicide Fluometuron.

The adsorbents were characterized by Powder X-Ray Diffraction (PXRD), FT-IR Spectroscopy, Thermogravimetric (TG) and Differential Thermal Analyses (DTA), Particle size distribution curves, Nitrogen adsorption–desorption isotherms and Transmission Electron Microscopy (TEM).

Besides the growing interest on these new hybrid materials, the greatest novelty in this paper has been the use of the Morris–Weber, Freundlich, Langmuir and Dubinin–Radushkevich equations to provide information about the adsorption mechanism of Fluometuron on these materials and if adsorption or intraparticle diffusion could be the determining step of the adsorption rate as well as to predict the adsorption efficiency and to distinguish between physical and chemical adsorption.

The adsorbent was assessed for regenerability. The study of recyclability was performed using ethanol as solvent. The results suggest the possibility to use periodic mesoporous organosilicas as a filter for removing Fluometuron from contaminated water.

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