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Organo-clay sorbents for environmental remediation

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Scientific community is nowadays strongly involved in the development of original and environmentally sustainable strategies for the simultaneous decontamination and exploitation of wastewaters.
A green sustainable approach, consisting in the use of hybrid materials prepared by intercalation of both natural and synthetic biocompatible surfactants onto different phyllosilicates is here proposed. Equilibrium adsorption isotherms, kinetics and XRD analyses were performed in order to characterize the prepared composites. Aiming at evaluating the performances of the prepared sorbents in the removal of contaminants and to achieve the better strategy for water decontamination, samples of real effluents and/or aqueous solutions mimicking wastewaters, were treated by means of different protocols, for instance batch and column treatments.
The proposed procedure revealed very promising and effective for the achievement of the prefixed goals and, regardless of the employed protocol, the organophobic modification of the clay surface enhances adsorption capability toward the potentially toxic organic molecules present in the contaminated waters.
The realization of the prefixed objectives not only answered the requirement to reduce the environmental damage but it also provides a profitable strategy to the recovery of valuable by-products present in wastewaters, thus satisfying the growing need for availability of economic resources for the production of chemicals, materials or fuels.