

Clay minerals and modified species for removal of anionic and cationic pollutants

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Clay minerals can be modified using different approaches to obtain innovative materials for application as sorbents in removal of anionic and cationic pollutants from wastewater, groundwater and soil [1] [2]. Modification with organic substances (organoclay) improves hydrophobization needed if interaction with low polarity organic molecules is necessary, but, chemical modification with inorganic species, e.g., hydrated iron or oxyapatite supports the physical improvement of sorption and ion exchange process in order to benefit treatment of media from cationic pollutants [3] [4].

The aim of research is both to develop innovative methods of synthesis and test efficiency of clays modified chemically with inorganic particles and organic functional groups. Series of test experiments were performed for natural, synthetic modified and organoclay by studying leaching and sorption properties in batch mode. Clay sorbents modified with iron oxyhydroxides, oxyapatites, graftpolymerized species achieved improved beneficial properties for specific remedial applications in different media [3] [5] [6].

Modification by use of organic functional groups ensured obtaining materials able to interact with organic molecules of various polarity. Modified clay species were characterized using texture analysis, BET surface area measurements, XRD and FTIR spectra were gained, sorption pattern was characterized by different models. SEM-EDX pictures helped estimation of physical surface patterns for modified material.

Studies revealed good perspectives of practical future use of modified clay species in soil, groundwater and wastewater treatment.

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