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Qualification of montmorillonite purification process for nanoclay production

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Abstract: Regarding the growing uses of the nanoclay for different applications nanoclay characterization has become highly important. However, there is not enough information about a developed characterization methodology of nanoclay materials. In this study the montmorillonite was purified using different physical or chemical methods and the purity of montmorillonite in the nanoclay samples were characterized using different methods such as XRD, SEM/EDX, FTIR, TG/DTA, and CEC. Results indicated that parallel comparison of results of different characterization methods would provide important information about the type of clay mineral, type of non-clay mineral in the samples, semi-quantification of minerals in produced nanoclay, and change in the nanometric characteristics of the nanoclay. Combination of XRD and SEM/EDX results provided interesting information about the amount of impurities in the nanoclay samples in addition to their structural morphology. Comparison of the CEC with the XRD results of the treated nanoclay samples provided information about type of clay in the nanoclay samples. And finally combination of XRD and TG results provided information about the type of other clay minerals (non-montmorillonite ones) in addition to existence of organic impurities in the nanoclay samples.

Keywords: *Montmorillonite; Nanoclay; Characterization; Purification.*

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