J Nanomater Mol Nanotechnol 2018, Volume 7
DOI: 10.4172/2324-8777-C7-039

Joint use of the silicate-hydroxide-carbonate precursor system, a new perspective in obtaining clay minerals

Christian Fabian Varela Olivera
Escuela de Ciencias Químicas, Universidad Pedagógica y Tecnológica de Colombia, Colombia

Design and functionalization of porous materials, including the based on clay minerals, is one of the most developed fields in materials science due to their multiple applications. Synthesis is a good strategy to avoid the secondary phases and impurities present in the natural minerals. The synthesis require a mineralizing agent which regulates the crystallization process, in phyllosilicates the solid state method has shown better results in the crystalline configuration, in this method the fluorides settled quickly as mineralizing agents for the synthesis, for allowing a greater thermal stability and the obtaining of materials with shorter reaction times, although, the kinetics of the process was improved, the use of fluorides and oxides as precursors led to the use of high calcination temperatures to reach the average diffusion temperatures of these compounds. In this work, several clay minerals were obtained by the solid-state method for the first time, with the joint use of sodium silicates, hydroxides and carbonates as precursor sources, the working temperatures were even 400 ° C below to reported in literature and with shorter reaction times. The materials were characterized by DRX, FTIR, SEM/EDX, in addition, net-crystal parameters, cation exchange capacity and specific surface were determined. The materials obtained showed high crystallinity, high thermal stability, textural properties and morphologies with possible applications as adsorbents and catalytic supports and high cation exchange capacity attributed to the presence of hydroxyl groups, finally, the generation of laminar discontinuities by dehydroxylation was studied elucidating the possibility of obtaining Sepiolite clay materials.