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# Modification of Sepiolite by Treatment with Fluorides: Structural and Textural Changes

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**Abstract:** In the search for new applications of natural silicates, various F<sup>-</sup> treatments have been applied to sepiolite to increase its acidic properties and for use as a catalyst in reactions occurring via carbonium ions. Two types of treatments including hydrofluoric acid (HF) at different concentrations and 2 N NH<sub>4</sub>F have been utilized and the physicochemical characteristics of the resulting materials studied using standard techniques. The X-ray diffractogram (XRD) patterns indicate a decrease in crystallinity of the original material as well as the appearance of amorphous silica. SEM micrographs showed a shortening and aggregation of the sepiolitic fibers. X-ray photoelectron spectroscopy (XPS), Fourier transform infrared (FTIR), thermogravimetric analysis/differential thermal analysis (TGA/DTA), N<sub>2</sub> adsorption-desorption isotherms and Hg intrusion were used to study the changes occurring in the structure, surface area and pore distribution of samples and acidity was evaluated by IR and thermoprogrammed desorption (TPD) of adsorbed ammonia and pyridine. It was found that acidity increased in most of the samples after anionic and cationic interchange between the activating agents and the surface sites, or extralattice cations. Additionally, structural changes induced by treatments modified the Brønsted and Lewis acidity. Mild treatments with ammonium fluoride are more effective than HF treatments in acidity generation.

**Key Words:** Activation • Fluoride Activation • Sepiolite • Silicate Acidity

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