

## **Comparative study of water-based and acid based sonications on structural changes of talc**

### **Abstract**

Talc was sonicated in both water and acid media up to 100h and 40h, respectively. The sonicated talc exhibited severe delamination and reduction of the plate diameter in the lateral dimension. The density of sonicated particles was reduced to  $1.64\text{g/cm}^3$  when sonicated in acid for 40h. Particles sonicated in the watermedium also exhibited higher aspect ratios compared to those sonicated in the acid medium. The sonicated particles exhibited structural changes where the degree of crystallinity especially in (001) planes were reduced; there were also decreases in crystallite size and increases in lattice strain for both media. Acid media sonication led to a lower degree of crystallinity compared to that in the water medium. The sonicated particles likewise exhibited shrinkage in lattice parameters for both media. Sonicated talc particles exhibited reduction of intensity for Mg-OH and OH stretching bands, but Si-O remained almost unaffected after 40h. Besides that, talc sonicated in both medium exhibited reduction in density and acid based sonicated talc shows the lower density of about  $1.64\text{g/cm}^3$  due to leaching of magnesium.

**Keywords** — Comminution, industrial minerals, particle processing, powder technology.