

Nanostructured $\text{Mg}(\text{OH})_2$ with the Primary Particle Size Control

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The obtaining of nanostructured inorganic powder materials with particles foreseen morphology (tubes, rods, lamellas) and size is one of the main goals of modern material science. Such structures have anisotropy of physical properties and are suitable for novel composite materials creation. Hydroxide and magnesium oxide are promising materials in this class. Nanostructured $\text{Mg}(\text{OH})_2$ for example is used as filler of polymeric materials with fire retardanting properties.

The purpose of our research is the elaboration of magnesium hydroxide nanoparticles synthesis method. The natural $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$ (bischofite) was used as a feedstock. The nanoparticles of $\text{Mg}(\text{OH})_2$ was formed by chemical sedimentation with the control of reaction medium pH by aqueous NaOH solution at a temperature of 20°C . The several samples of nanostructured $\text{Mg}(\text{OH})_2$ were obtained at the different pH levels. The final products were washed up to absence of Na^+ and Cl^- ions. Synthesized materials were characterized by XRD and scanning electron microscopy. Primary particles sizes was calculated from the Rietveld analysis of XRD data (fig. 1). It was found that the increasing of pH leads to decrease of primary particle size. For example, particles sizes for materials obtained at the pH level 9.0 and 11.0 were about 11 and 6 nm at the same time the agglomerates sizes are close (about $100 \mu\text{m}$) (fig.2).

As a result simple one step method of $\text{Mg}(\text{OH})_2$ nanoparticles obtaining with the possibility of primary particles size control has been developed.

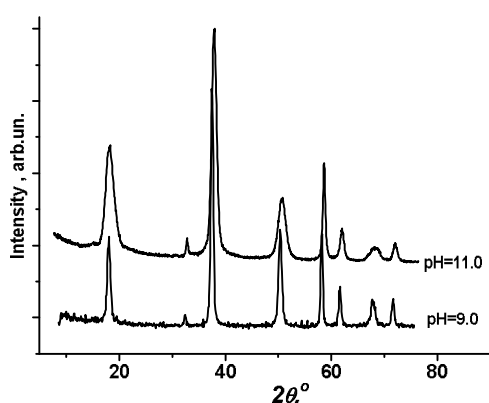


Fig.1. The diffraction pattern of nanostructured $\text{Mg}(\text{OH})_2$ obtained at the different pH of reaction medium

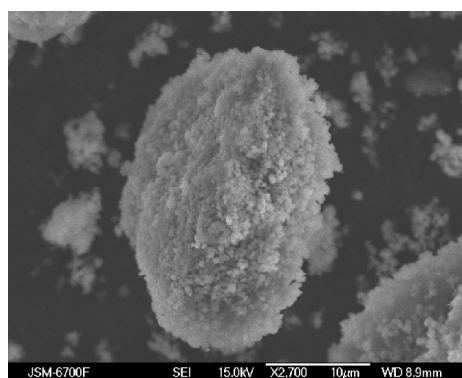


Fig.2. SEM photograph of nanostructured $\text{Mg}(\text{OH})_2$ obtained at pH=11