



MECHANISMS OF FORMATION AND REACTIVITY OF IMOGOLITE TYPES MATERIAL

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Reactivity of nanoparticles represents a central issue for many laboratories around the world. Among many supported efforts the control of the morphology of nanoparticles is motivated by the fact that morphology strongly influence the properties of the final products. Among the vast family of available nanoparticles, imogolite is a clay nanotube for which perfect control of the diameter is possible. Imogolites were first observed in volcanic soils[1]. They are natural aluminosilicate nanotubes having the general formula $(\text{OH})_3\text{Al}_2\text{O}_3\text{SiOH}$ with a 2 nm external diameter and up to micrometers in length. The impressive monodispersity in imogolite nanotube diameter has motivated research on their formation mechanism. Synthesis protocols to produce imogolite were quickly developed. Farmer et al. were the first to obtain synthetic imogolite using low concentrations of AlCl_3 and SiO_2 monomers as starting materials (millimolar concentrations of the reagents) [2]. However, the production of large amount of imogolite or imogolite type materials remained challenging for long time. We will present our most recent results concerning the possibility to produce imogolite type materials from highly concentrated stock solutions. We will also detail the possibility to form double wall Al-Ge nanotubes and the different stages of their formation [3-7]. We will then detail the surface reactivity of these nanotubes toward metals at the lab scale as well as in natural soil.

References

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