**Physico-chemical nanomaterials science**

**Hydroxyapatite and their clay nanocomposites as biocompatible systems for biomedical applications**

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Hydroxyapatite (HAP) and clay are very important materials used in many areas of human life, among other in medicine, cosmetics, and also in industry or in environmental protection. Composites obtained on the basis of these substances allow to expand their applicability. Targeted products, depending on their purpose must characterize appropriate physicochemical properties, including crystalline structure, porosity, density, functionality or particle size. The behavior of such materials in different systems, including biological or environmental, is influenced by such parameters as surface charge and value of potential at the interface of composite/solution of electrolyte. Clay is defined as naturally occurring material composed mainly of fine-grained minerals. Clay is generally plastic at appropriate water content, and it is hardened as dried or fired. Clay usually contains phyllosilicates; however, clay might contain other materials which can affect the properties [1].

The particle sizes and zeta potential of the aqueous suspensions of clay samples (kaolinite, china clay, white-blue clay, white clay and hydroxyapatite as well white-blue and hydroxyapatite composites, in the majority of the selected systems) were measured using a Zetasizer Nano ZS90 (Malvern). The results of the zeta potential measurements shows that pHIEP was below 2. The total surface charge at clay/electrolyte interface results the isomorphic substitution of Si+4 andAl+3ions in the phyllosilicate lattice forming structural charge and reaction of surface hydroxyl groups with the electrolyte ions creating net adsorbed proton charge density [2]. Because isomorphic substitution lead to negatively charge that dominate over charge the surface of clays at pH>2 is negatively charged. Dispersed particles of clays undergo coagulation the result in the delamination of the samples.

1. *Rautureau M.,. Figueiredo G. C. de S, Liewing N., Katiozian –Sfadi, M.,* Clays and HealthSpringer 2017.