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Influence of mechanochemical treatment on electrochemical properties of the interfaces: silica-collagen composite/solution of electrolyte and hydroxyapatite-collagen composite/solution of electrolyte. Part II

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Hydroxyapatite (HAp), SiO_2 and collagen 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.

Present studies were conducted on two series of composites prepared mechanochemically (MChT) on the basis on hydroxyapatite and SiO_2 and collagen as a biologically active substance. MChT processes were performed at different rotations of mill (200 and 400 rpm) and various periods of time (30, 60 and 120 min). Mineral adsorbents (HAp and SiO_2) treated MChT individually under the same conditions as collagen composites were reference samples.

For the obtained samples the porous structure and particle size distribution was determined and, first of all, electrochemical studies to determine the surface charge density and dzeta potential values as a function of pH and electrolyte concentration at the interfaces of composite/solution of electrolyte were conducted.

It has been found that pHpzc values are different for composites and their individual counterparts, but for samples with collagen these values increase. At the investigated systems, the dzeta potential depends on the ionic strength, pH, and mechanochemical processing time.