

Extended Abstract

Decorated Apatitic Materials: Synthesis, Characterization, and Potential Application [†]

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The literature provides us several examples of apatitic materials in whose structure the calcium ions are substituted by different metals, which are remarkable for their applicability in heritage conservation, bioremediation, and biomedicine [1–4]. According to the desired properties, several methods were developed to obtain these apatitic materials. The decoration of the apatitic structure with metal and metal oxide nanoparticles is far less studied, even though it provides the development of more economical materials, using mild reaction parameters [2].

Hydroxyapatite was prepared according to a recipe developed before in the laboratory [4]. For the incorporation of copper in the hydroxyapatite's structure, we studied two approaches: the decoration of hydroxyapatite with metal nanoparticles and metal oxide nanoparticles. The copper nanoparticles were obtained using a modified Turkevich method [2]. The decoration of the apatitic materials was achieved post-synthesis, using metallic oxide nanoparticles and metallic ions.

To confirm the nanoparticles' synthesis, the obtained materials were subjected to UV–Vis spectroscopy. The X-ray fluorescence, X-ray diffraction, FTIR spectroscopy, transmission electron microscopy, and thermal analysis were performed to confirm the obtainment of the decorated apatitic materials. In order to evaluate their potential applications, we studied their antimicrobial, phytotoxic, and cytotoxic effects.

Two types of apatitic materials decorated with copper and copper oxide nanoparticles were obtained; the developed materials were analytically characterized, and their potential application was proven by the antimicrobial, cytotoxic, and phytotoxic assays.

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