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Abstract

Surface Consolidation of Model Stone Samples with Carbonated Hydroxyapatite †

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Recently, numerous studies have been carried out on various materials with potential applications in the preservation and restoration of cultural heritage objects. Among the studied materials, special attention has been given to hydroxyapatite (HAp) regarding its use as a consolidating agent for various types of artifacts: stone, paper, and wood [1]. The selection of CHAp as a potential material for the protection and consolidation of carbonate stones was based on its low solubility and slow dissolution rate.

Carbonated hydroxyapatite (CHAp) and its metallic derivatives, Me-CHAp (Me=Ag, Sr), as very fine and uniform-sized powder, have been obtained by the nanoemulsion technique and characterized by Raman spectroscopy, thermogravimetric analysis (TGA) and transmission electronic microscopy (TEM). The surfaces of some model stones were consolidated with CHAp and Me-CHAp applied by brushing, immersion and spraying, Figure 1 and colorimetric tests have been correlated with water drop absorption, water repellency, penetration of water measurements and compressive strength.

Some model stones have been treated with these consolidants, and the effectiveness of CHAp and Me-CHAp as inorganic stone consolidants was tested.

The application method and the type of carbonated hydroxyapatite play a very important role in determining the final effects of the consolidating treatment. Based on the obtained results, these consolidants were selected for application on some monument surfaces.

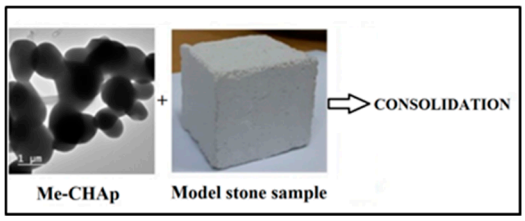

Figure 1. Model stone sample treated with metallic carbonated hydroxyapatite (Me-CHAp).

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