

Study of the protection and conservation of glass artifacts using nanomaterials with the practical application of the restoration and maintenance of glass artefact.

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Abstract:

In recent years, nanoparticles have played a major role in the protection and conservation of antiquities. These nanoparticles are dispersed in different polymers to improve their properties and to obtain nanoparticles. These materials have achieved a significant and unprecedented breakthrough in improving the physical and mechanical properties of polymers used in Reinforcement and protection of glass surfaces, due to nanomaterials of very small size, very large surface area compared to their sizes and the significant increase in their chemical activity. As a result of the manufacture of these new Multifunctional Nano composites, which are applied in a single step, which has more than one function in the protection of the surfaces, due to the enjoyment of these compounds with many characteristics, the most important: the ability to expel water Super hydrophobic surface and cleaning The nanotechnology applications have increased the efficiency of traditional treatment materials and provided more tolerant surfaces for weather and friction, and surfaces that problems of accumulation of dust and dirt through the theory of Self-Self cleaning, as well as resistance to micro living organisms, resist the impact of UV.

Key Words:

Glass artifacts, Nanomaterials, Examination and analysis, Self-cleaning, Protection.

Study of Glass protection and conservation using Nano materials.

This chapter focuses on the linguistic origin of the word Nano as well as the Nanometre and its relation with other measurements. Moreover, it casts light on the study of nanotechnology and the history of nanotechnology. This chapter includes the study of Nano materials as a new category of the material whose dimensions range from 1-100 nanometer as well as the most important Nano materials represented in mono-dimensional Nanomaterials, bi-dimensional Nano materials and tri-dimensional Nanomaterials, along with the study of the most important used scientific methods in their preparation.

Furthermore, it deals with the most important characteristics and properties of Nano materials resulting from infinite zero in the dimensions of the grains forming these materials, which

affects all the properties of these materials positively. It has been proved that if the measurements of the dimensions of the grains forming this material decreases to 3% nanometer, approximately 5% of the total number of the existent atoms in one grain becomes centred on the outer surface of the grain. This results in a great increase in the effectiveness and activity of the material formed by these grains. Accordingly, this greatly affects most properties of the material whether these properties are mechanical, chemical, physical, visual, electrical or magnetic.

Furthermore, chapter three deals with the most important applications of nanotechnology in the field of the restoration and conservation of artifacts. It highlights the role that nanotechnology plays in improving the properties of used material in strengthening and protecting artifacts. It also deals with multifunctional compound Nano materials in the one layer, performing more than one function.

This chapter includes the study of Nano materials in the protection and conservation of glass artifacts as these materials have ability to repellent water. The study of self cleaning Nano materials, their ability to resist living organisms and their resistance to ultraviolet rays has been done.

Applied study on selected stored glass artefact.

This paper deals with the conservation and protection of glass artefact stored in Museum of Islamic Art in Cairo: the glass artefact recorded with a number (6628). The documentation and registration of the glass artefact has been done using AutoCAD and photographic registration. The deterioration aspects done to this registration has been observed. The processes of examination and analysis have been carried out using scanning electron microscope attached with EDX unit, X-Ray diffraction, Infra-Red Absorption spectrophotometry and microbiological inspection.

After the process of restoration and conservation has been fulfilled, the process of mechanical cleaning starts using safe technique was performed, and then the process of chemical cleaning and initial assembling carried out using 1092 Araldite. Under the process of completion, it has been deduced that there is no need to carry out the double and singular mould in the process of the completion of missing parts of glass. Finding creative solutions that suit the state of the artifact and the places of the missing parts should be thought of. This is clear in the glass artifacts under study. The process of consolidation and protection comes after that by Nano paraloid B-72 added to Nano Zinc which proved to be successful in the experimental side. The process of storage carried out with materials most of which were acidity-free, using simple techniques and tools that can be followed in the process of preservation and storage.

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