The emergence of nanoscience and nanotechnology has led to great developments in electrochemical science and technology, which led to a new branch of electrochemistry research—electrochemical nanotechnology—that combines electrochemical techniques with nanotechnologies to address important issues in energy, electronics, environment, and health care. For example, in the last decade, newly developed nanotechnologies (including electrochemical nanotechnologies) have enabled researchers to find and produce a variety of nanostructured materials with highly controlled and unique optical, magnetic, or catalytic properties. Furthermore, the diversity in composition (inorganic or organic, metals, or semiconductors), shape (particles, rods, wires, or tubes), and the readiness for surface functionalization (physical, chemical, or biological) have made it possible for various functional nanomaterials to be fabricated for sensing, electrocatalysis, energy storage and conversion. The new millennium presents opportunities as well as challenges to scientists and engineers working in the dynamic field of functional nanomaterials. The functionalization and engineering of nanostructured materials represent the key emerging technologies in biomedicine, such as the processing of new biomaterials, biofunctionalization of surfaces, characterization of biomaterials, discovery of novel phenomena and biological processes occurring at the molecular level. This Nano-seminary introduces the applications of nanomaterials in the field of electrochemical technology provided by Tor Vergata University, especially in the Incubator’s scientific Laboratories, focusing on nanodevices, nanoelectronics, sensors, energy storage and conversion, nanomedicine/health care, food packaging and environmental monitoring (air and water quality control). It also demonstrates that electrochemical nanotechnologies can provide solutions to significant technical barriers and potentially revolutionize research in these emerging areas. Especially, in the case of the Conservator and Restorer Scientists, the great advantages to apply no invasive and no destructive materials and technologies, with high restoration efficiency, seem to be very promising to solve the aging effects and serious damages observed on the deteriorated Art Work surfaces. In addition, the electrochemical engineering represents a Green Chemistry Science, producing eco-friendly nanostructured materials, exhibiting Highest Biocompatibility features, when compared with the conventional/traditional materials, widely used in the Restoration and Conservation field (in Indoor & Outdoor environments), during the past time.
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