Laser Cleaning In Conservation: An Introduction

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RUBY LASER BEAM INTERACTION WITH CERAMIC AND COPPER ARTIFACTS

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Abstract

Preventive care, research, and restoration of cultural heritage objects requires multidisciplinary research and the involvement of experts of different profiles, using high technology equipment. Non-destructive methods dominate in the diagnosis of the situation and protection of cultural heritage objects. The application of lasers has opened many possibilities for research in the field of protection, conservation, restoration, and/or assessment of artifacts. We present the results of the interaction of ruby-laser light with the surfaces of Neolithic ceramics (Obrenovac, Serbia) and samples of copper of unknown age. The investigation was conducted in order to determine the maximum energy density of the laser light that can be applied in nondestructive testing and encrustation cleaning of these ceramic and metal cultural heritage objects. We investigate the laser-light interactions using a scanning electron microscope (SEM) with energy-dispersal unit for the analysis of *X*-rays (EDX).

Keywords: laser interactions, cultural heritage, scanning electron microscope, energy-dispersal unit for the analysis of *X*-rays (EDX).

1. Introduction

The applications of new technologies have led to the expansion of numerous methods and techniques of scientific investigation and protection of cultural heritage. Contactless methods that do not impair the integrity of objects of cultural heritage have the greatest significance. Among them, laser methods are dominant [1–21]. Lasers are widely used in various fields of science, technology, medicine, art, and cultural heritage protection. Optical methods and techniques that use lasers as light sources are applied for different diagnostics of cultural heritage (holographic interferometry, ESPI, spectroscopy, 3D-laser scanning, etc.).

Laser cleaning methods were first applied in the early seventies of the last century. Today, lasers are the focus of experts' interest with regards to the protection of cultural heritage. The first laser application, which was used to clean objects of cultural heritage, was made in Italy, where modified holographic ruby and Nd-YAG lasers were employed for the removal of calcium sulfate from the surface of stone figures of lions on the portal of the Palazzo Ducale in Venice [4, 5].

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Full-Text Paper (PDF): Principles of laser cleaning in conservation. useful to introduce separately these different phenomena starting from their linear regimes .Martin Cooper's pioneering book will give anyone with an interest in the conservation of artworks a basic understanding of the laser cleaning technique so that.'Laser Cleaning in Conservation' is the first book to be written on this subject. The extremely selective cleaning offered by lasers results in very high quality.Laser cleaning in conservation: an introduction / edited by Martin Cooper. Publication Library Call Number: NL3 C66 Book cover. Format: Book.Laser cleaning is growing in importance, particularly in applications such as the removal of small debris particles from semiconductors and in art conservation. With the With the introduction of the Montreal protocol, which proposes long- term.An Introduction to lasers: Light radiation and the electromagnetic spectrum. Laser optics and cleaning: Introductory optics including reflection and absorption.11 Jan - 9 sec Free Download book kachemile.com?book= Laser.Laser Cleaning in Conservation is the first book to be written on this subject. Development of the laser as a practical tool has been a significant advance in the .1. INTRODUCTION. Laser cleaning methods have been employed over the past three decades in a number of conservation cases including.The thesis begins with an introduction to the subject of laser cleaning in the context of conservation. The final part of this chapter includes a brief summary of the.Laser cleaning of artworks in cultural heritage has received .. set of practice, paper conservation experts selected relevant samples.Keywords: paintings / excimer laser / LIBS / on-line control / beam manipulation. 1. Introduction. As scientific research in the conservation field progresses, the.The laser cleaning project on the Athens Acropolis sculptures is a unique example of laser .. Laser cleaning in conservation: an introduction.International Academic Projects are collaborating with Lynton Conservation (which has been supplying laser cleaning systems to the.becoming more and more popular for dirt removal is the laser cleaning method. This method Introduction. Commonly used methods of surface cleaning in conservation of art works are based on mechanical or chemical techniques which are.