

ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ
ΤΜΗΜΑ ΕΠΙΣΤΗΜΗΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΑΣ ΥΛΙΚΩΝ

ΠΑΡΟΥΣΙΑΣΗ ΜΕΤΑΠΤΥΧΙΑΚΟΥ ΔΙΠΛΩΜΑΤΟΣ ΕΙΔΙΚΕΥΣΗΣ

Τίτλος

«Ultrashort-pulse laser fabrication of biomimetic metallic surfaces»

«Κατασκευή βιομιμητικών επιφανειών με υπερβραχείς παλμούς laser»

Μιμίδης Αλέξανδρος

Μεταπτυχιακός Φοιτητής

Τμήματος Επιστήμης και Τεχνολογίας Υλικών, Πανεπιστημίου Κρήτης

Επιβλέπων καθηγητής κ. Γ. Κιοσέογλου

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Αίθουσα Β2,

Κτίριο Χημείας,

Πανεπιστήμιο Κρήτης

Abstract

The aim of this thesis is the experimental investigation of structuring metallic surfaces with linearly polarized Gaussian femtosecond laser pulses, in order to achieve controllable surface modification. Steel samples were irradiated with a focused ultra-short laser pulses and the morphology was studied as a function of fluence and number of pulses. Laser Induced Surface Structures (LIPSS) were structured on the sample surfaces following irradiation with tunable micro periodicity. A complete study was conducted investigating LIPSS periodicity as a function of wavelength, fluence and number of pulses. Furthermore large areas were fabricated with laser scanning method achieving each type of morphology observed for every type of steel. This work was conducted by irradiating samples a) in air and b) immersed in water, comparing results. Finally, wetting properties of the surfaces were investigated with i) water droplets ii) oil droplets and compared to the untreated surface showing an increase in water repellency but the surfaces remained super oleophilic.