ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ
ΤΜΗΜΑ ΕΠΙΣΤΗΜΗΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΑΣ ΥΛΙΚΩΝ

ΠΑΡΟΥΣΙΑΣΗ ΜΕΤΑΠΤΥΧΙΑΚΟΥ ΔΙΠΛΩΜΑΤΟΣ ΕΙΔΙΚΕΥΣΗΣ

Τίτλος

«Synthesis and characterization of acid- and photo-degradable star polymers»

Ηλιάδη Νίκη

Μεταπτυχιακή Φοιτήτρια

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Επιβλέπων καθηγήτρια κ. Μ. Βαμβακάκη

Τετάρτη, 10/10/2018,

10:00 π.μ.,

Αίθουσα Α210,
Κτίριο Τμήματος Μαθηματικών και Εφαρμοσμένων Μαθηματικών,
Πανεπιστήμιο Κρήτης

Polymers, both synthetic and natural, have a broad range of properties that make them essential in everyday life. This has led to an incredible amount of research on polymers and their synthesis, as well as their applications, prominent amongst which is the research on stimuli responsive materials. Materials such as these undergo changes in their physicochemical properties after being exposed to an external stimulus and have proven to be extremely sought after, especially in the field of drug and gene delivery, for the enhanced control they afford. This Master Thesis focuses on the synthesis of novel cross-linkers that have the potential to be stimuli-sensitive and their subsequent use to form star polymers that are sensitive to external stimuli. Two different cross-linkers were synthesized that led to the successful formation of star polymers via group transfer polymerization (GTP). These polymers were thoroughly characterized by size exclusion chromatography, nuclear magnetic resonance spectroscopy, dynamic light scattering and scanning electron microscopy. Afterwards, their sensitivity to external stimuli was successfully proven. The

polymers containing either type of cross-linker, were found to be sensitive to a decrease in the pH value due to the characteristic acetal groups they carry, that resulted in degradation of the cross-linkers and thus degradation of the star polymers. One of the synthesized cross-linkers, and thus the star polymers formed during the polymerization process, was also found to be photo-degradable under irradiation at 254 nm due to the aromatic groups it carries along with its characteristic acetal bonds. The degradation of all synthesized polymers was proven by utilizing the characterization techniques as described above.