ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ

ΤΜΗΜΑ ΕΠΙΣΤΗΜΗΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΑΣ ΥΛΙΚΩΝ

ΠΑΡΟΥΣΙΑΣΗ ΜΕΤΑΠΤΥΧΙΑΚΗΣ ΔΙΠΛΩΜΑΤΙΚΗΣ ΕΡΓΑΣΙΑΣ

Τίτλος

Site-selective functionalization of silica rod-like colloids

του **Γεώργιου Καρχιλάκη**

μεταπτυχιακού φοιτητή του Τμήματος Επιστήμης και Τεχνολογίας Υλικών του Πανεπιστημίου Κρήτης

Επιβλέπουσα Καθηγήτρια: Μαρία Βαμβακάκη

Παρασκευή 17 Μαρτίου 2023

Ώρα 13:00

Η παρουσίαση θα πραγματοποιηθεί στην **αίθουσα Α2 (Α115), στο κτήριο του Τμήματος Επιστήμης Υπολογιστών**, του Πανεπιστημίου Κρήτης

Abstract

Anisotropic colloids have attracted great attention lately in materials research, because, unlike their isotropic counterparts, they possess unique directional interactions. Specifically, single- and multi-patchy Janus colloidal particles have been proposed for the next generation of functional materials, owing to their unique asymmetry. Among the wide variety of materials chosen to synthesize patchy particles, silica has been extensively used, because it allows its facile surface functionalization leading to chemically anisotropic colloids. In this work, the synthesis of Janus rod-like particles, presenting chemical and shape anisotropy, was pursued utilizing different synthetic approaches. First, monodisperse, bullet-shaped, silica colloids were synthesized. Next, the silica rods were exploited for the preparation of amine-functionalized Janus silica particles with polar heads by introducing an organo-silica precursor with an amino functionality in the last step of the synthetic protocol. The self-assembly behavior of the Janus silica rods was investigated in solvent media of different polarity. Furthermore, hybrid polymer-silica particles were prepared via a typical dispersion polymerization of methyl methacrylate in the presence of the bullet-shaped colloidal silica rods, which led to matchstick-shaped silica particles. The polymer was anchored exclusively at the flat end of the rods, rather than at the curved surface due to favorable interactions with the surface of the colloids. In the last part, silica rods of different aspect ratios were self-assembled onto polystyrene particles by exploiting a Pickering emulsion strategy. The protection of half of the rod surface, allowed the chemical modification of the exposed part, to obtain Janus silica particles.