

Ηράκλειο 19 Ιουλίου 2022

ΠΑΡΟΥΣΙΑΣΗ ΔΙΠΛΩΜΑΤΙΚΗΣ ΕΡΓΑΣΙΑΣ

Της φοιτήτριας Αντωνίας Αθανασάκη, θα γίνει τη

Πέμπτη 28/07/2022 και ώρα **16:00**

στην αίθουσα Α210 του Κτιρίου Μαθηματικού

Επιβλέπων: Δημήτρης Βλασσόπουλος

Θέμα Διπλωματικής:

«Effects of humidity on the dynamics of Supramolecular Polymer solutions»

Abstract:

Supramolecular polymers are formed by motifs that are held together with non-covalent, directional bonds. Their viscoelastic properties depend on the association/dissociation dynamics of bonds and their environment. In this thesis we investigated experimentally the consequences of relative humidity and temperature on the linear and especially, nonlinear viscoelasticity of an entangled hydrogen-bonded supramolecular polymer solution in an apolar solvent. We used a hydrogen bonding motif 2,4-bis(2-ethylhexylureido)toluene (EHUT), which self-assembles in dodecane, forming supramolecular structures (tubes or filaments). The problem we addressed is the interplay of water molecules (which dissolve at minute amounts in dodecane) and the dynamics of the supramolecular polymers (we focused on tube structures).

For this reason, we utilized a specific repeated shear stress startup/relaxation protocol and analyzed the characteristic time for loss of topological constraints/junctions at steady state as a function of the applied constant shear rate, the sequence of test and the level of relative humidity. We compared our findings with those obtained with a conventional synthetic polymer solution with not bond exchange kinetics. Our results point to the role of break/association time of EHUT on the nonlinear dynamics at different external conditions and provide a new way to distinguish the behaviors of physically-bonded supramolecular and covalently-bonded polymers.