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ΤΜΗΜΑ ΕΠΙΣΤΗΜΗΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΑΣ ΥΛΙΚΩΝ

ΠΑΡΟΥΣΙΑΣΗ ΜΕΤΑΠΤΥΧΙΑΚΟΥ ΔΙΠΛΩΜΑΤΟΣ ΕΙΔΙΚΕΥΣΗΣ

Τίτλος
«Acrylic polymers at liquid interfaces»

Σεβαστάκη Μαρία

Μεταπτυχιακή Φοιτήτρια

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Abstract

In the present thesis the structural and rheological properties of viscoelastic films of acrylic polymers were studied. The experiments were performed at the air-water interface using a Langmuir trough.

Our aim is to understand the relation between the macromolecular conformation and interfacial properties, and compare against respective behavior in the bulk.

To this end well-characterized samples of acrylic polymers of varying molecular weights and molecular structure were used. Langmuir monolayers were built with two different types of molecular systems, two series of homopolymers, Poly (methyl methacrylate) (PMMA), and Poly n(butyl acrylate) (PBA) with different molecular architectures. The protocol involves compression-expansion cycles and rheology by means of the magnetic rod interfacial stress rheometer.

For structural studies of the films at the air-water interface we performed neutron reflectivity measurements. We observed great tenability of the structural and rheological properties of the PMMA samples moving from

simple (linear-dendritic) molecules to more complex architectures with a characteristic phase transition. Acrylics exhibit perfectly reversible layers at the air-water interface showing a reproducible PMMA phase transition for all the different structures and molecular weights. Last but not least, Flory radius analysis were scaled as RF-N for all different categories and the results were interesting.