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Department of Materials Science & Engineering

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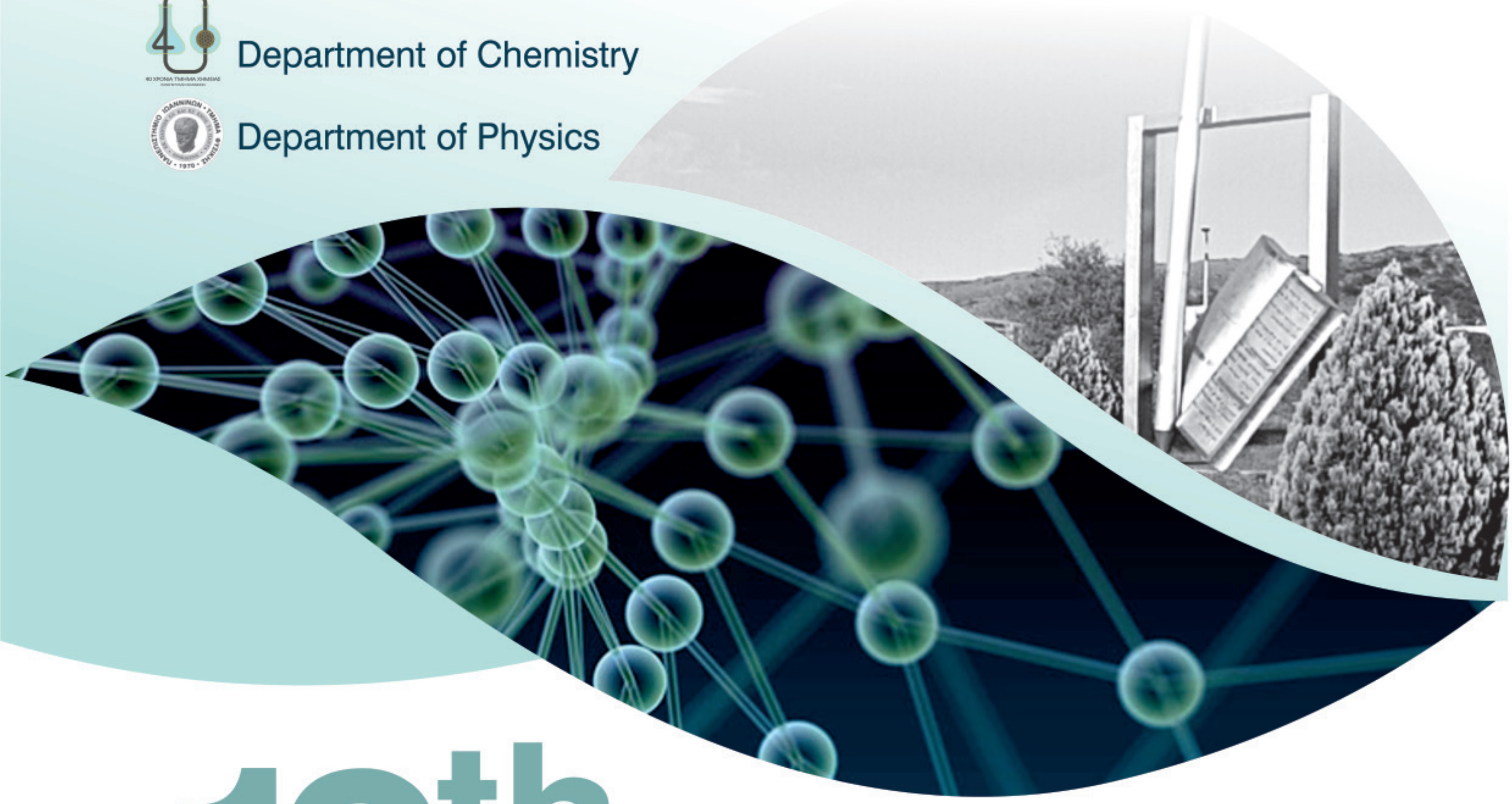

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"Georgios Mylonas"

ABSTRACT BOOK

POSTER 4.8

THERMORESPONSIVE PROPERTIES OF ALGINATE-BASED GRAFT COPOLYMERS

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Alginate is a natural polysaccharide with various applications in biomedical science and engineering due to its properties, such as biocompatibility and gelation. Hydrogels of grafted alginate have been particularly attractive in drug delivery, and tissue engineering, as these gels retain a structural similarity to the extracellular matrices in tissues. This work is focused on the synthesis and rheological studies of sodium alginate graft copolymers with a hydrophobic enrichment of amino-terminated PNIPAM (poly(N-isopropylacrylamide)) or P(NIPAM-co-NtBAM) (NtBAM: N-tertiary-butyl-acrylamide). The characterization of the polymers was studied by ^{1}H NMR and UV-VIS Spectroscopy while, the thermoresponsive properties of the hydrogels were investigated by rheological experiments. The Lower Critical Solution Temperature (LCST) of the side chains (LCST of PNIPAM ≈ 32 ^{o}C) should be close and below the physiological temperature to behave as sol at room temperature and as gel inside the human body. The results of this study present, the influence of hydrophobic enrichment of the grafting chains in the critical temperature of the sol to gel transition and the impact in the thermothickening behavior of the alginate graft copolymers. In conclusion, the prepared alginate-based graft copolymers meet the requirements for a biodegradable thermo-induced injectable hydrogel that could be used for biomedical potential application.

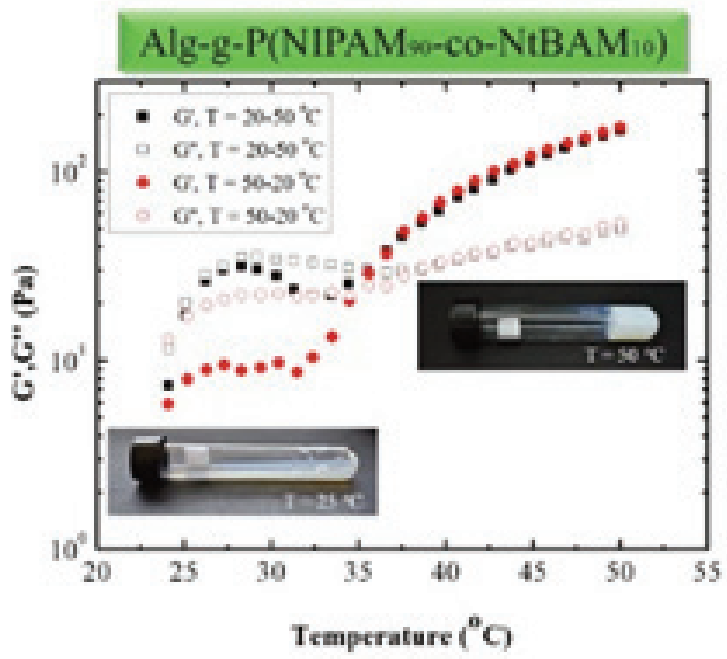

Figure 1. Temperature dependence of elastic moduli of Alg-g-P(NIPAM$_{90}$-co-NtBAM$_{10}$) copolymer (black data: heating; red data: cooling). Inset: photos of polymer solution at 25°C and gel formed at 50°C.