

Name-Surname	Areti Theodora
Thesis Title	<i>Effect of dispersed nano graphene platelets on molecular dynamics, electric charge conduction and critical behaviour in the vicinity of the percolation threshold in polyvilyl alcohol at pressures from 1bar to 2600bar and temperatures from 20oC to 120oC</i>
Supervisor	A. Papathanassiou, Assistant Professor
Summary	The dispersion of graphene nanoparticles (NGP) in polyvinyl alcohol (PVA), a water-soluble, ecological friendly, non-toxic and biocompatible polymer, results in composite materials combining the properties of them. The nanoparticle fraction leads to the emergence of competing flow or trapping mechanisms of electrical carriers which are studied at temperatures from 20°C to 120°C and a hydrostatic pressure regime from 1 to 2600 bar for various nano platelet concentrations around the percolation threshold. Additionally, the combined temperature and pressure selection, provides the possibility of changing the matrix from semi-crystalline to rubber. The flow of electric charge in this system is studied by a combined change of the above mentioned parameters using broadband dielectric spectroscopy and the mechanisms are understood at a microscopic level by the determination of (dynamic) activation volumes and activation energies. There is a collective convergence of the values of these microscopic quantities close to the critical point.
Key words	nanocomposites, polyvinyl alcohol, nanographene platelets, dielectric spectroscopy
Evaluation committee	A. Papathanassiou, Assistant Professor I. Lelidis, Assistant Professor V. Lykodimos, Assistant Professor