



ΕΡΕΥΝΗΤΙΚΟ ΙΝΣΤΙΤΟΥΤΟ ΧΗΜΙΚΗΣ ΜΗΧΑΝΙΚΗΣ ΚΑΙ ΧΗΜΙΚΩΝ ΔΙΕΡΓΑΣΙΩΝ ΥΨΗΛΗΣ ΘΕΡΜΟΚΡΑΣΙΑΣ

Οδός Σταδίου, Πλατάνι, Πάτρα
<http://www.iceht.forth.gr>

ΣΕΜΙΝΑΡΙΟ

ΟΜΙΑΗΤΗΣ: J. Karger-Kocsis, Professor
Affiliation: Institut für Verbundwerkstoffe GmbH, Universität Kaiserslautern,
Germany

ΘΕΜΑ: MICROSTRUCTURAL, MORPHOLOGICAL AND MOLECULAR
DEPENDENCE OF THE FRACTURE BEHAVIOR OF POLYMER
SYSTEMS

ΤΟΠΟΣ: Αίθουσα Σεμιναρίων ΕΙΧΗΜΥΘ-ΙΤΕ

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ΠΕΡΙΛΗΨΗ

The engineering application of polymers and related systems necessitates the assessment of reliable toughness parameters. This can be achieved by using suitable methods of the fracture mechanics, since they yield inherent material data. Due to the high ductility of many polymers, the use of approaches of the non-linear fracture mechanics, like J-integral and the specific essential work of fracture, seems to be most straightforward. The open question in this respect is how the inherent toughness parameter correlates with molecular and/or morphological characteristics of the polymers. An attempt will be made to disclose and substantiate the correlations between fracture mechanical and (micro)structural characteristics. It will be shown that the influence of the matrix decreases by incorporation of fillers and reinforcements, where the reinforcing microstructure is becoming dominant and even methods of the linear elastic fracture mechanics can be adopted. For plain polymers of amorphous and semicrystalline nature the effects of molecular variables (molecular weight, entanglement density) and structural hierarchy (e.g. crystalline modification, crystallinity, mean spherulite size and higher order structures) will be treated in details.

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Τηλ: (061) 965.278, Fax: (061) 965.223, Email address: kleanthi@iceht.forth.gr