



ΙΔΡΥΜΑ ΤΕΧΝΟΛΟΓΙΑΣ ΚΑΙ ΕΡΕΥΝΑΣ

ΕΡΕΥΝΗΤΙΚΟ ΙΝΣΤΙΤΟΥΤΟ ΧΗΜΙΚΗΣ ΜΗΧΑΝΙΚΗΣ
ΚΑΙ ΧΗΜΙΚΩΝ ΔΙΕΡΓΑΣΙΩΝ ΥΨΗΛΗΣ ΘΕΡΜΟΚΡΑΣΙΑΣ
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ΣΕΜΙΝΑΡΙΟ

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- ΘΕΜΑ:** **ADVANCED CONTINUOUS NANOFIBERS AND NEXT GENERATION STRUCTURAL SUPERNANOCOMPOSITES**
- ΤΟΠΟΣ:** Αίθουσα Σεμιναρίων ΕΙΧΗΜΥΘ-ΙΤΕ
- ΗΜΕΡΟΜΗΝΙΑ:** Τετάρτη, 14 Μαΐου 2003
- ΩΡΑ:** 19:00

ΠΕΡΙΛΗΨΗ

Continuous nanofibers with diameters several orders of magnitude smaller than the diameters of conventional advanced fibers can revolutionize existing and create entirely new applications. Examples include superstrong/tough and transparent composites and coatings, structural elements in MEMS/NEMS, and many others. Progress in these and other areas depends on the development of reliable methods of nanofiber manufacturing, assembly, and processing into nanocomposites, and on our ability to predict and optimize their mechanical properties. Recent work on related topics by the author's group will be reviewed in this presentation. Progress on theoretical and experimental analysis of electrospinning process of manufacturing of continuous nanofibers will be reviewed. Examples of novel high-performance continuous polymer, carbon, and ceramic nanofibers will be presented and compared to commercially available reinforcing fibers. Modeling-based development of integrated methods of controlled manufacturing of nanofiber assemblies will be described and examples of highly ordered assemblies will be demonstrated. Several new ways to utilize nanofibers economically in advanced structural nanocomposites will be introduced and discussed, including nanocomposites with interphases and hybrid nano/microcomposites. Pioneering design of advanced laminated composites with nanofiber-reinforced interfaces introduced by the author will be analyzed in depth. Effects of nanofiber reinforcement on static and fatigue fracture toughness, strength, and durability of composites will be demonstrated. Experimental and numerical evaluation of nano- and micro-mechanisms of improvement will be discussed. Recent results on impact fracture of these novel materials will be presented. Current work in progress and prospects for international collaboration will be discussed.