



ΕΘΝΙΚΟ ΜΕΤΣΟΒΙΟ ΠΟΛΥΤΕΧΝΕΙΟ
ΣΧΟΛΗ ΧΗΜΙΚΩΝ ΜΗΧΑΝΙΚΩΝ

ΕΠΙΤΡΟΠΗ ΣΕΜΙΝΑΡΙΩΝ, Καθηγητής Α. Κοκόσης

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ΣΕΜΙΝΑΡΙΟ ΧΗΜΙΚΗΣ ΜΗΧΑΝΙΚΗΣ

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Simone Musso

Massachusetts Institute of Technology

**From Fullerenes to Graphene passing through carbon
nanotubes: Synthesis, properties and applications of
quasi-new allotropes of carbon**

In 1985 an allotrope of carbon with the formula of C₆₀ was produced by laser ablation technique on graphite. Since then, the family of fullerenes has been very popular and accessible to any researcher and a number of promising applications have been suggested. Fullerenes can be used as (1) a starting material for super-hard materials and diamond, (2) precursors for CVD diamond films and SiC, (3) lithographic films, (4) optical limiters, (5) solar cells, (6) lubricants, (7) catalysts, (8) fullerene-containing polymers, and (9) medicines.

In 1991 S. Iijima observed and identified tubular structures, produced from an arc discharge technique, entirely made of perfectly crystallized carbon named carbon nanotubes (CNTs). Since their discovery, CNTs have attracted a great deal of attention because of their outstanding and unique physical and chemical properties. New and more efficient deposition techniques, such as chemical vapor deposition (CVD and PE-CVD) have been developed, enabling researchers to investigate CNTs potential applications in many fields: (1) field emission guns for FED, (2) hydrogen storage, (3) chemical sensor, (4) filler for nanocomposites, (5) heat sinks for high power electronic devices, and so on.

At last, in 2004 a group of physicists from Manchester University, UK succeed to produce a two dimensional form of graphitic carbon, named graphene. Before that, this monolayer of carbon atoms hybridized sp² had been largely studied only from a theoretical point of view. Very interesting properties (ballistic transport, quantum Hall effect, thermal conductivity, mechanical stiffness), make this new material a promising candidate for future electronic applications as well as a reinforcement in nano-composites.