Nanomateriali multifunzionali per applicazioni industriali

Stefania Albonetti
stefania.albonetti@unibo.it

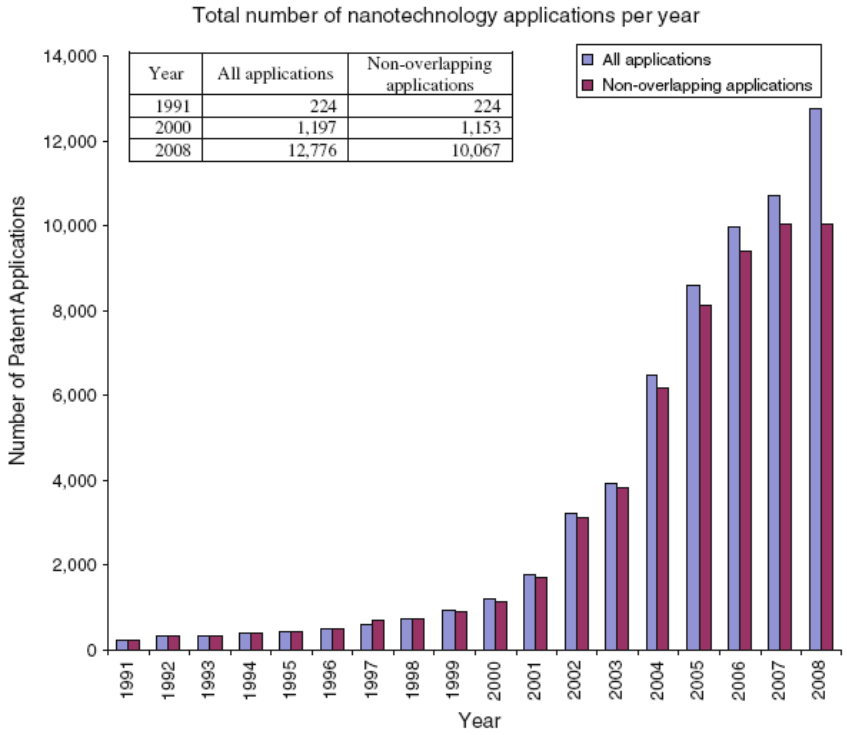
Facoltà Chimica Industriale Bologna

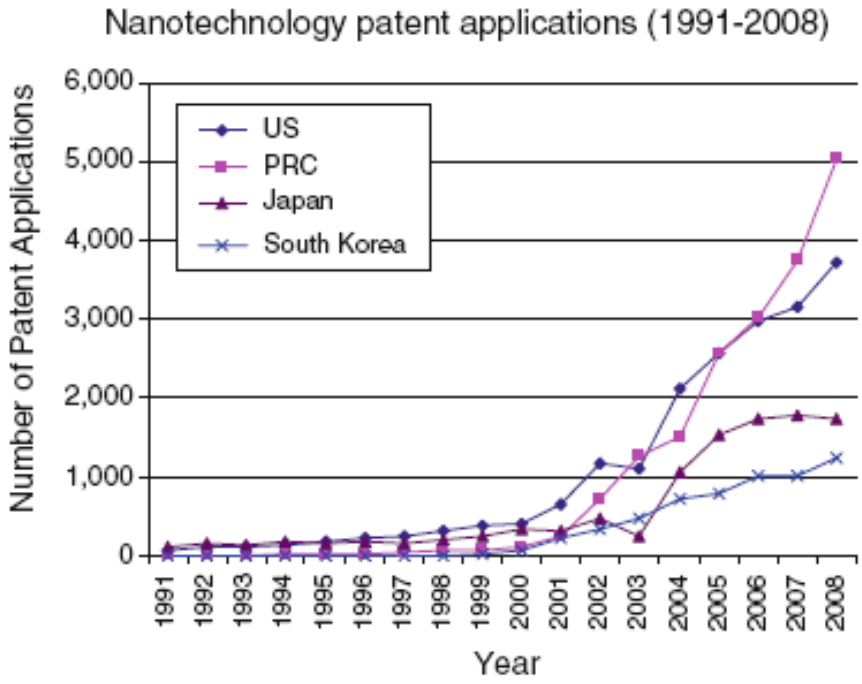
Unità CIRI Faenza: Meccanica avanzata e materiali

Ravenna, 27 Settembre 2011

Perchè interessarsi ai nanomateriali

Deposito di brevetti per applicazioni riguardanti l'utilizzo di nanomateriali (1991-2008)

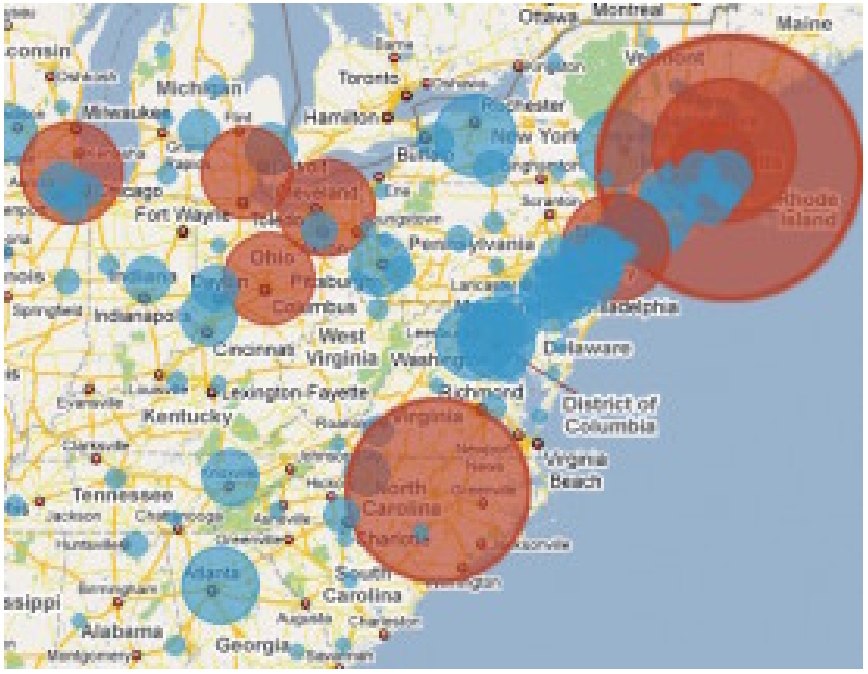




J. Nanopart Res (**2010**) 87-706

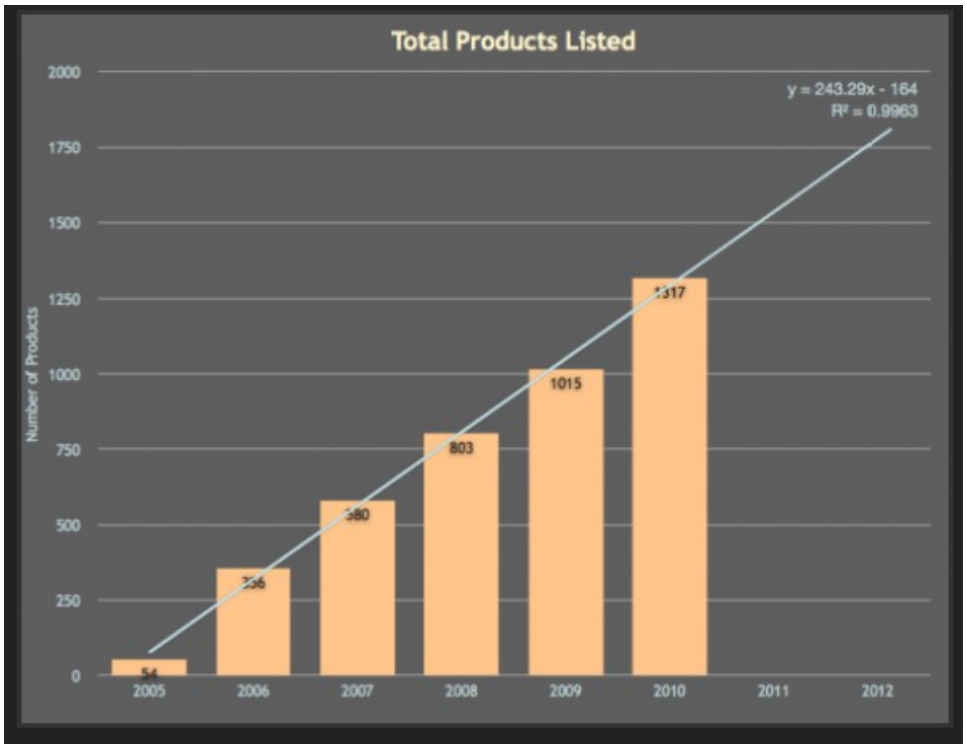
Perchè interessarsi ai nanomateriali

Distretti nanotech in USA

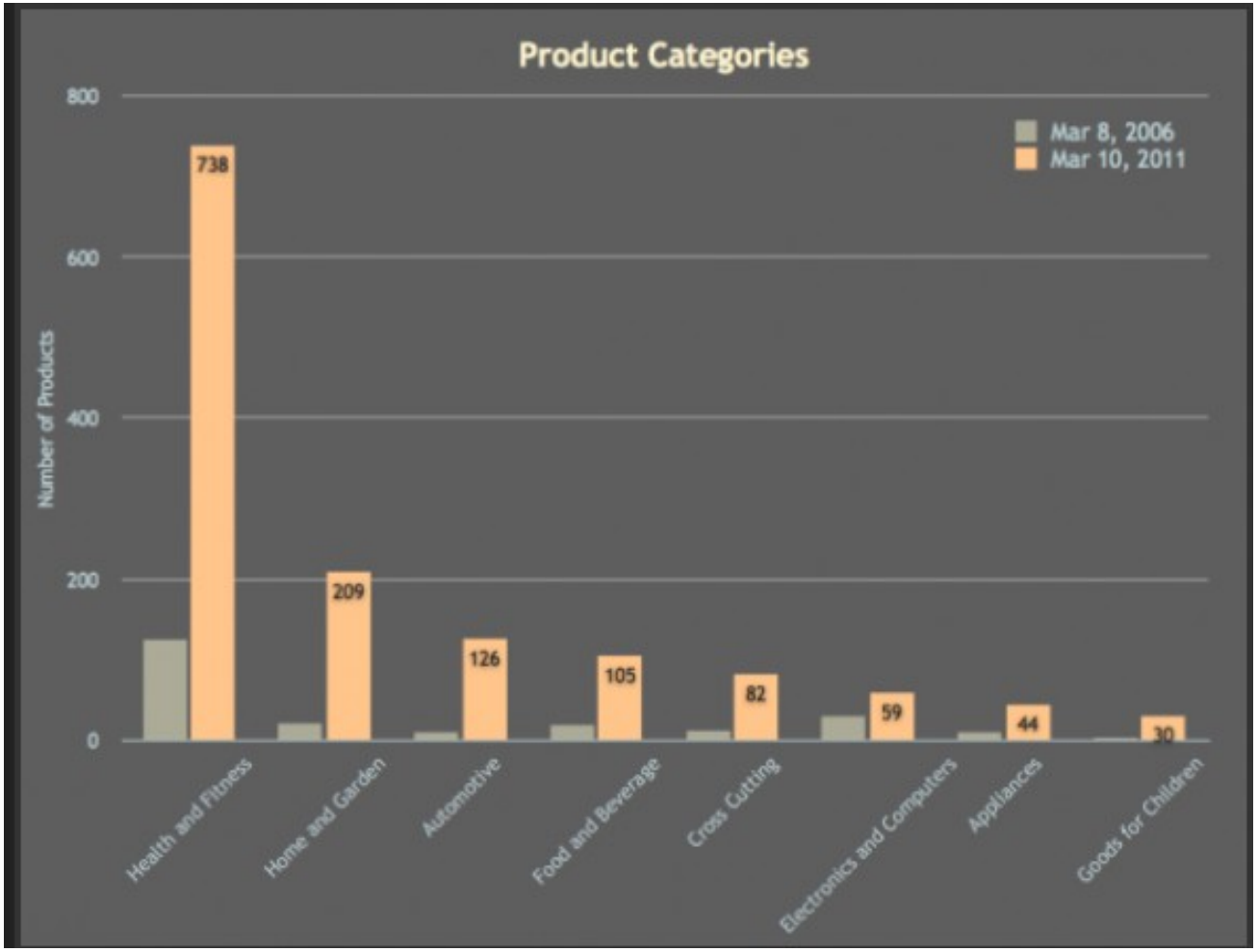


http://www.nanotechproject.org/

Prodotti già disponibili sul mercato basati su nanomateriali



Perchè interessarsi ai nanomateriali



Settori:

Salute e sport

Casa

Auto

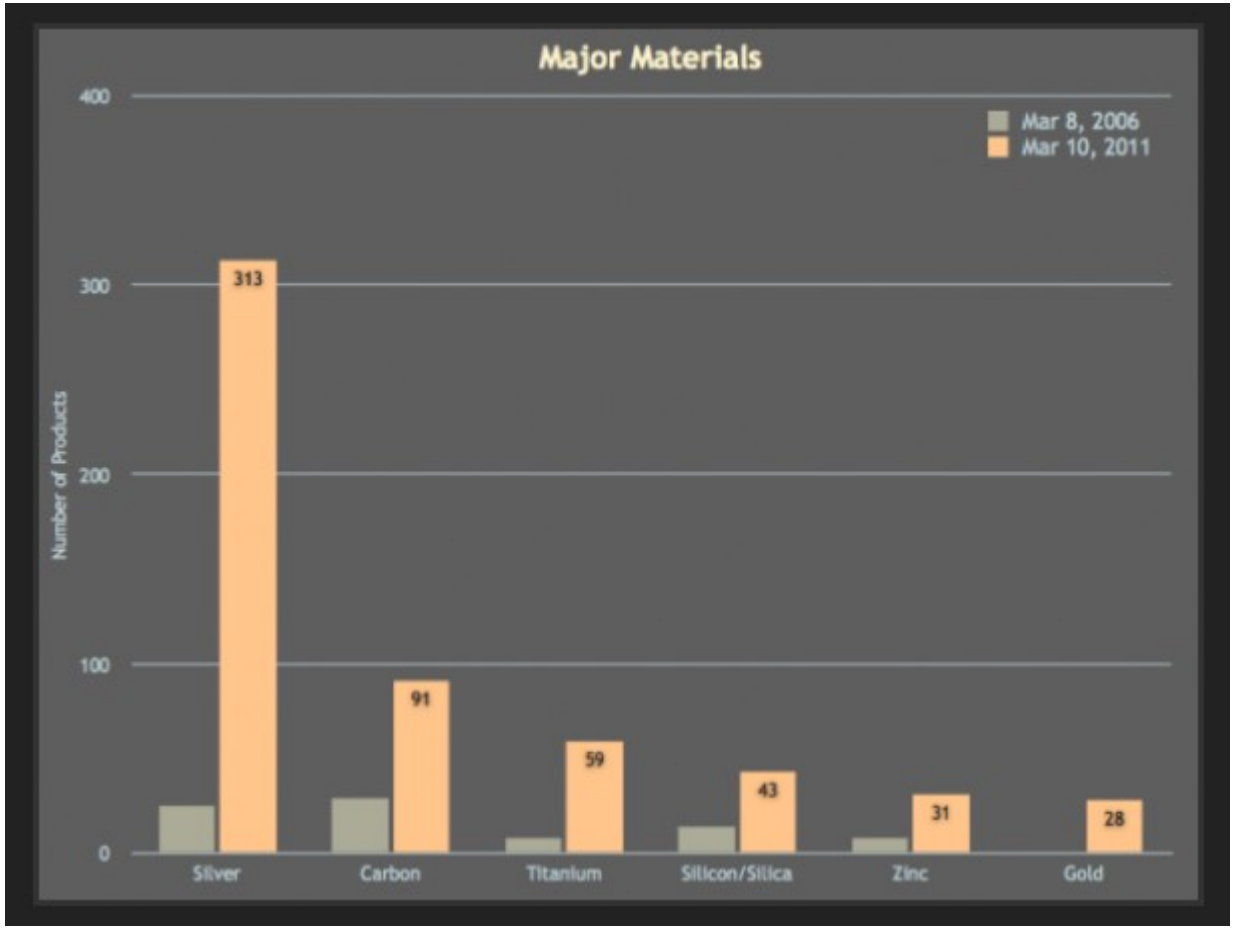
Cibo e bevande

Elettronica

<u>Esempio 1</u>:
Cosmetici
Abiti
Attrezzi per lo sport
Filtri solari

http://www.nanotechproject.org/

Perchè interessarsi ai nanomateriali

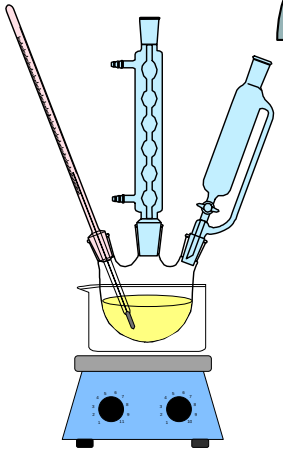


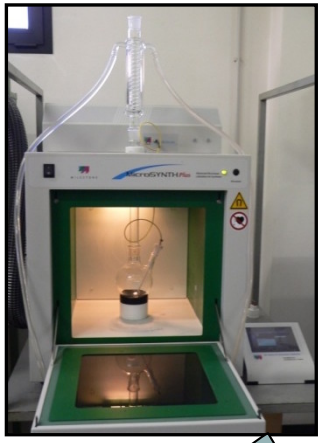
Nanomateriali più utilizzati:

- Argento
- Ossido di titanio
- Ossido di zinco
- Oro
- Nanotubi C

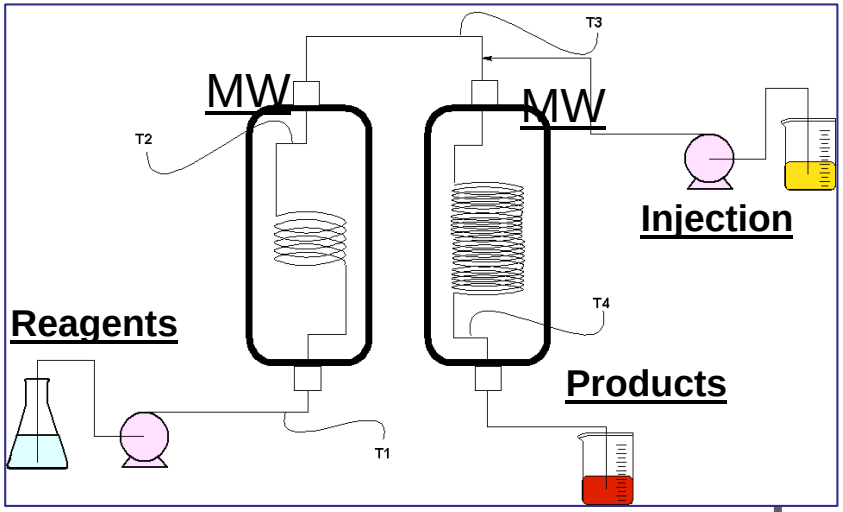
http://www.nanotechproject.org/

Processi di produzione di nanomateriali





Sintesi con Microonde – riscaldamento rapido e omogeneo che assicura un miglior controllo dei fenomeni di nucleazione ed accrescimento.

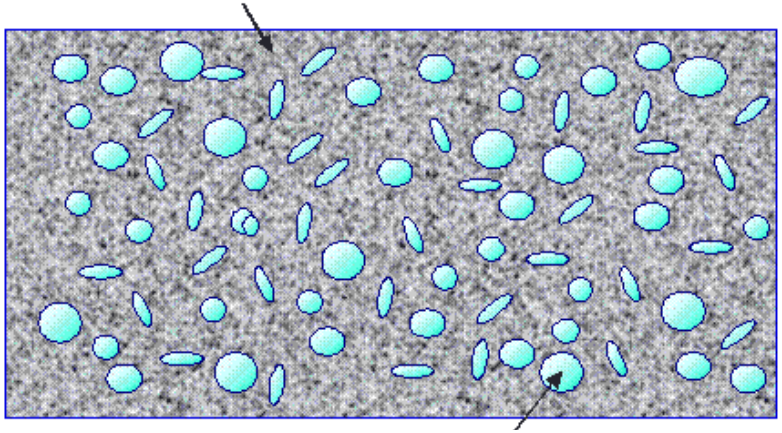


M. Dondi, M. Blosi (CNR-ISTEC), S. Albonetti with Colorobbia "Microwave-assisted polyol synthesis of Cu nanoparticles" J**. Nanopart. Res. 13 (2011) 127.**

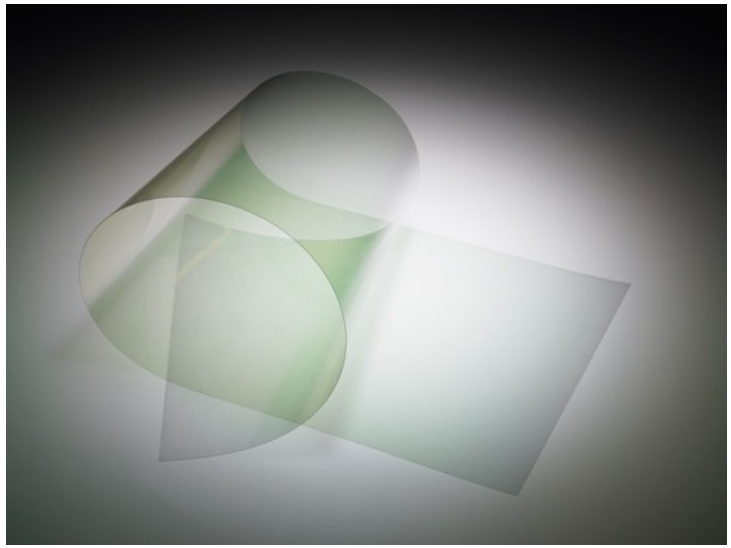
Brevetto - M. Dondi, M. Blosi *(CNR-ISTEC),* S. Albonetti "Process for preparing stable suspensions of metal nanoparticles and the stable colloidal suspensions obtained thereby" **PCT/EP2010/052534 (March 2010), WO2010/100107** Colorobbia Italia SpA.

Nanomateriali inorganici quali additivi funzionali per polimeri

Polimero



Nanoparticelle

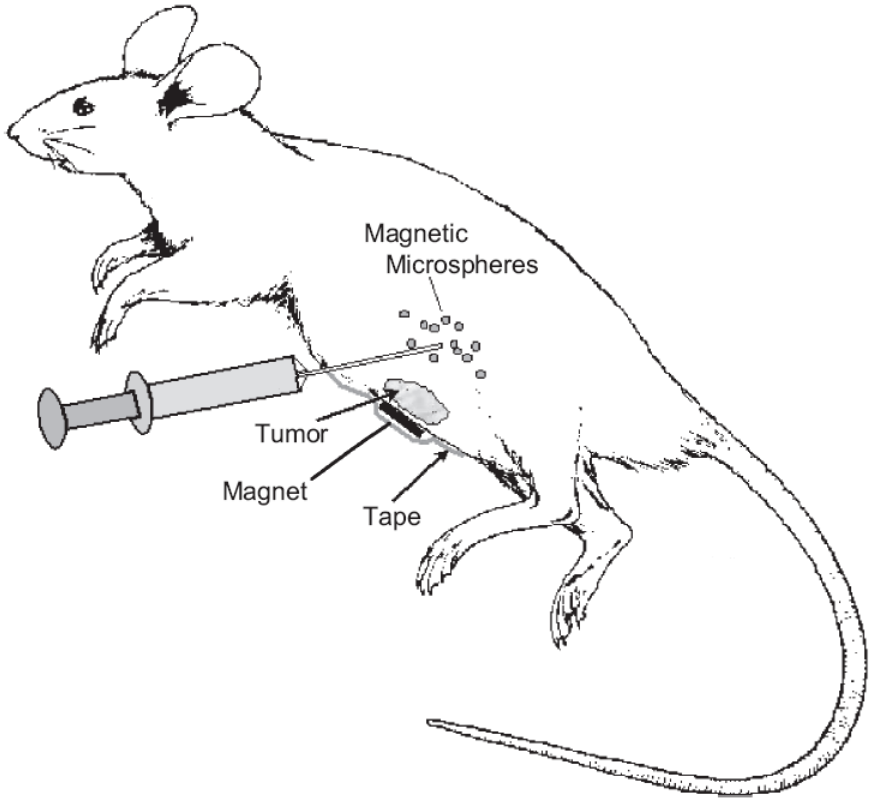


Applicazioni:
Controllo della permeabilità dei gas
Polimeri conduttivi
Polimeri funzionali (es. riflettenti o assorbitori per radiazione IR etc.)

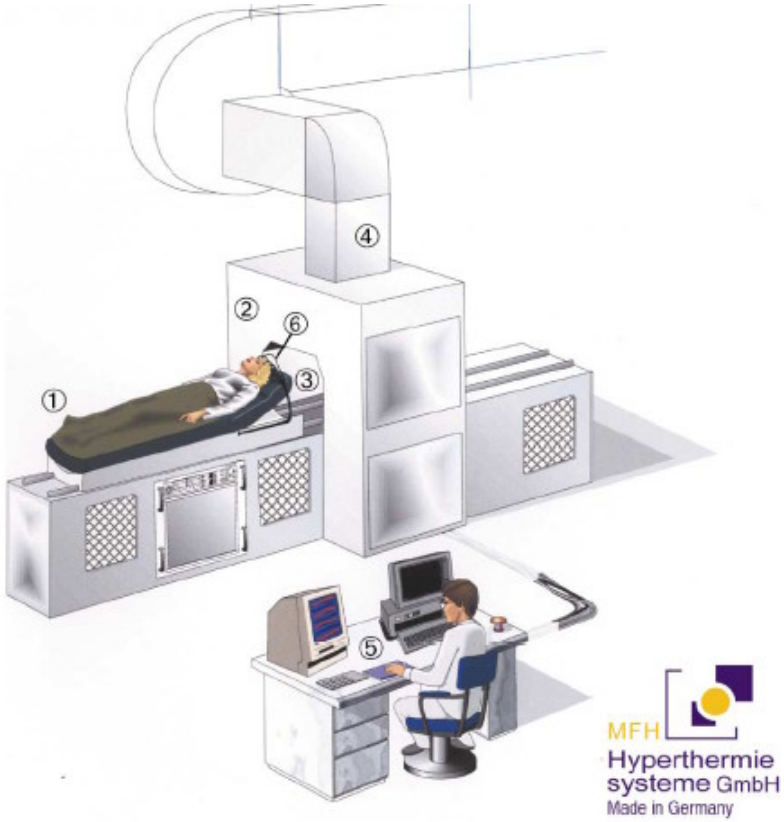
S. Albonetti et al. (with CIBA) "Solvothermal synthesis and properties control of doped ZnO nanoparticles" **J. Colloid Interface Sci. 329 (2009) 73.**

Nanomateriali in medicina

Rilascio controllato dei farmaci

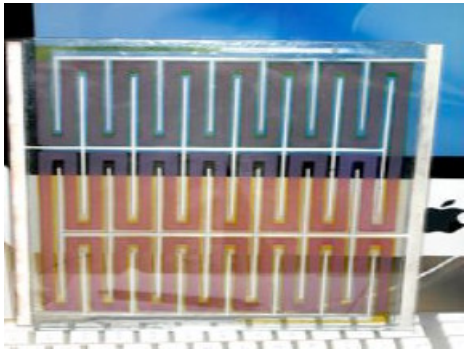


Terapia per la cura dei tumori (Magnetic Hyperthermia)



M. Comes Franchini et al. ***"****Robust ligand shells for biological applications of gold nanoparticles"*
Langmuir 24 (2008), 13572.

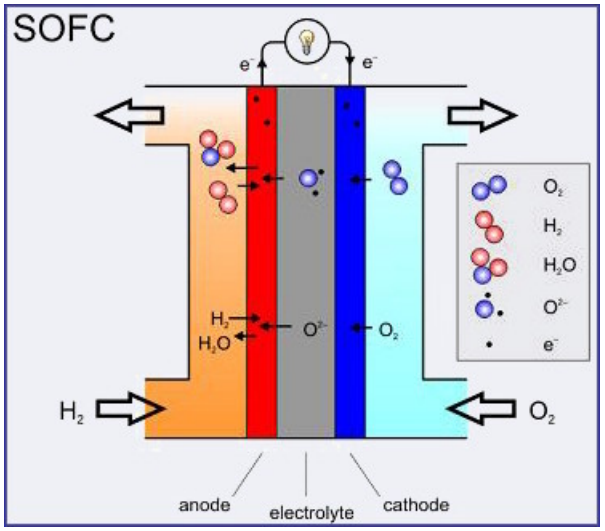
Nanomateriali per l'energia e la produzione di H_2

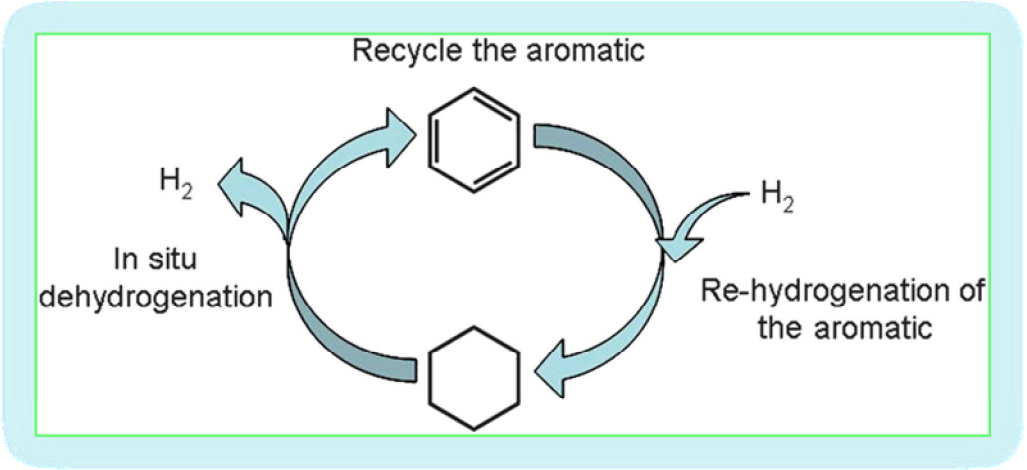


Celle fotovoltaiche DSSC

Nanomateriali per la produzione e lo stoccaggio di H_2

Celle a combustibile

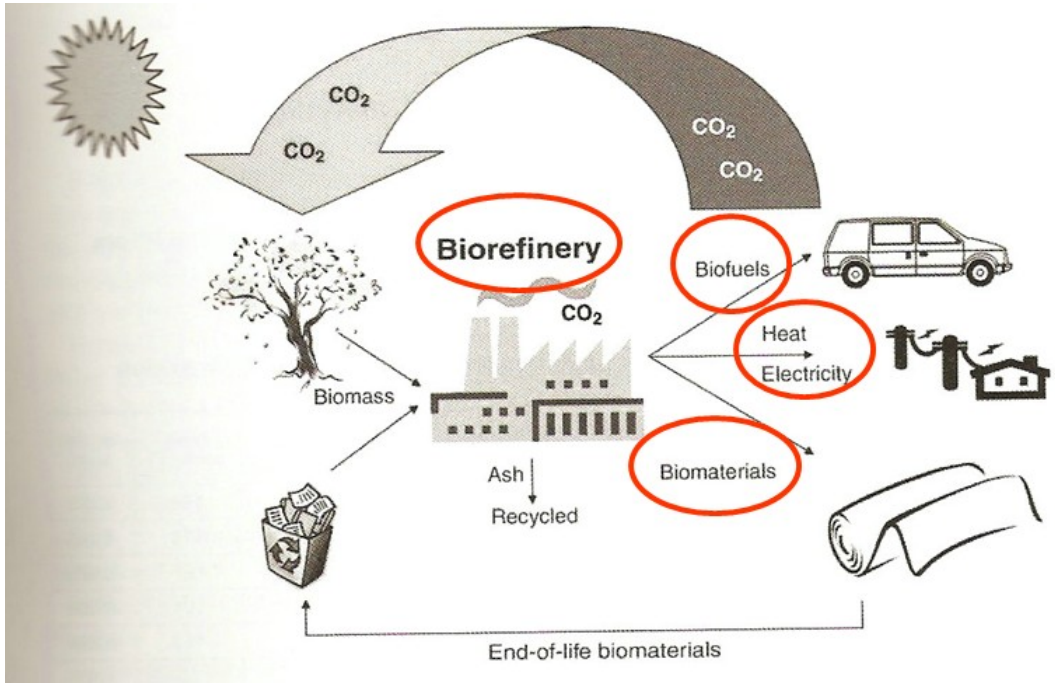


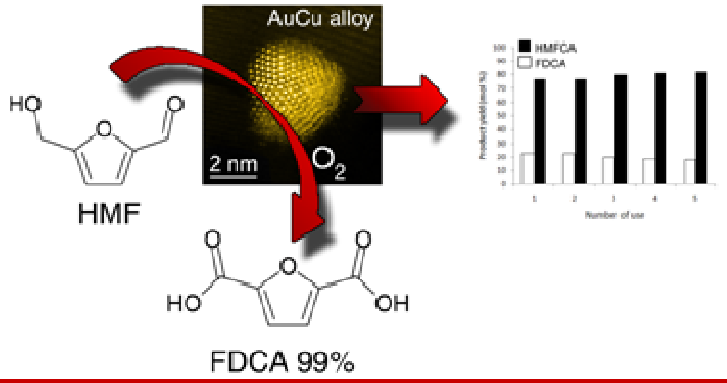


A. Sanson (CNR-ISTEC), S. Albonetti et al. "Microwave-assisted synthesis of gadolinia-doped ceria powders for solid oxide fuel cells" ***Ceramic International 37 (2011) 1423***.

S. Albonetti, A. Vaccari et al. (Progetto Europeo GreenAir) ***"On-board H_2 generation by catalytic dehydrogenation of hydrocarbon mixture or fuels" Catal. Today 175 (2011) 504.***

Nanomateriali per la catalisi e la valorizzazione delle biomasse

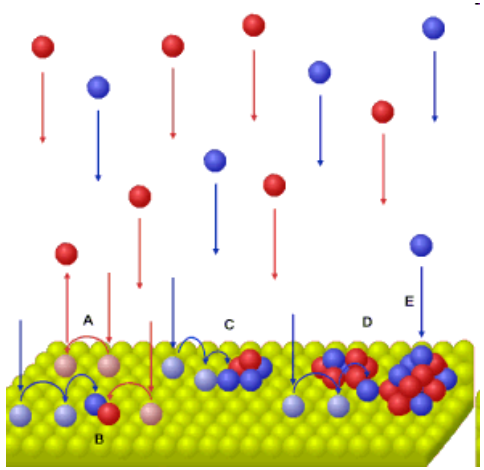


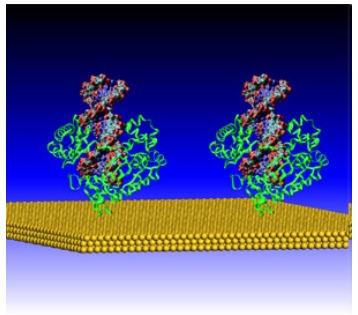


S. Albonetti, M. Blosi et al. *"Selective oxidation of 5-hydroxymethyl-2-furfural using supported gold-copper nanoparticles."* **Green Chemistry 13 (2011) 2091.**

Deposizione di nanosol mediante elettrosintesi

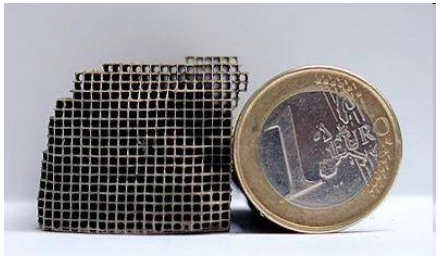
Simultanea riduzione dei precursori e deposizione sul substrato (conduttivo, metalli, ITO, grafite etc.)

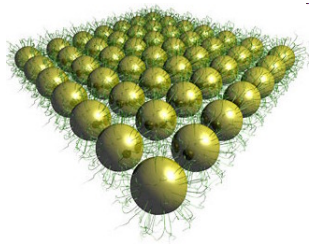




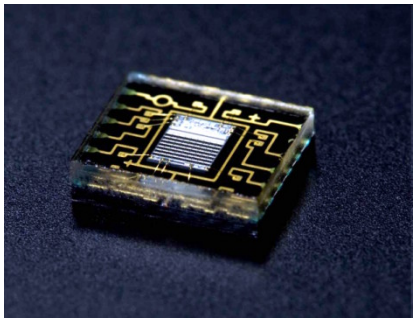
biosensori

Catalizzatori strutturati





Sensori elettronici



B.Ballarin, M.C.Cassani *et al.*
Electrochimica Acta 56 (2010) 676–686