

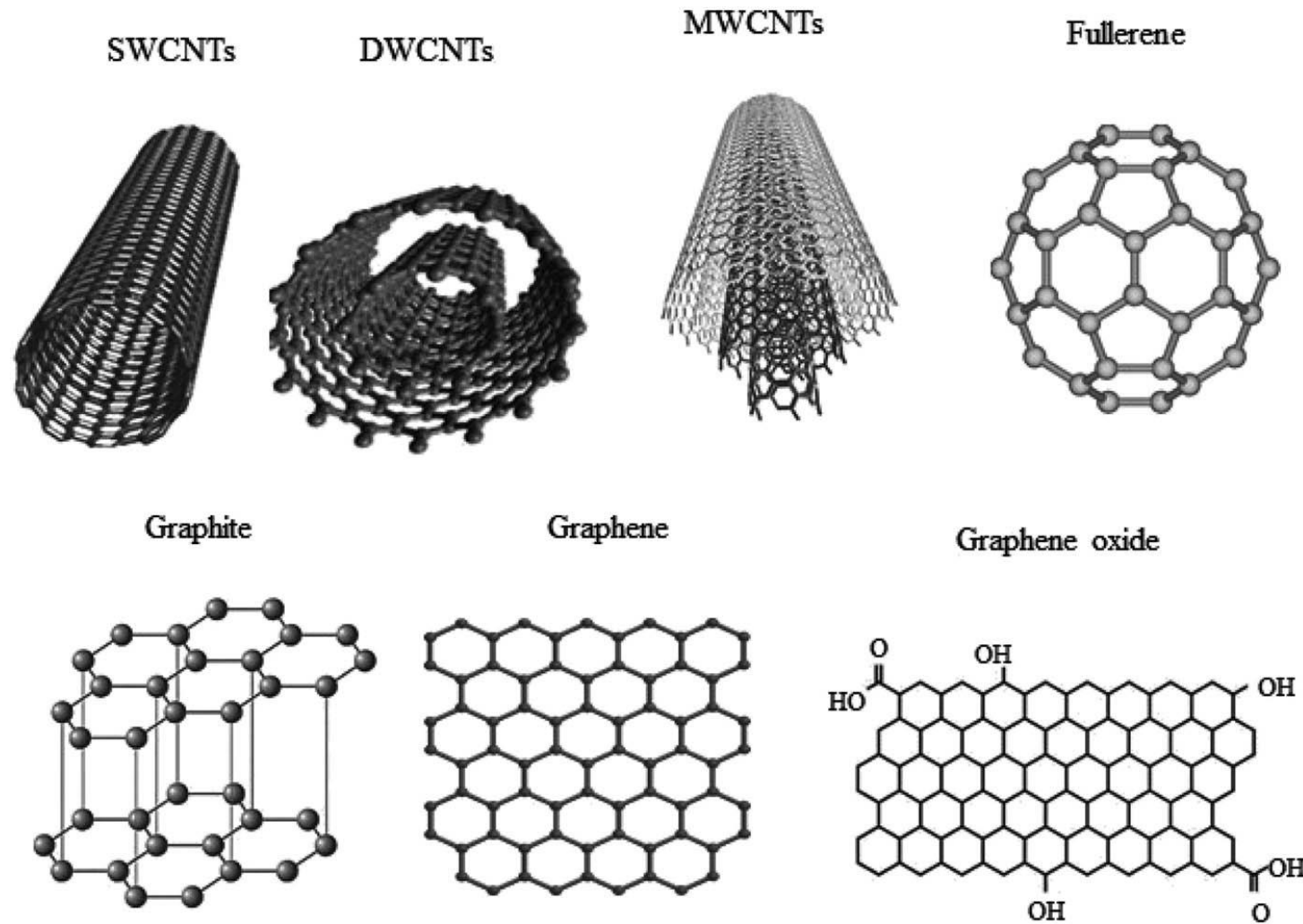
Grafene e materiali 2D per sensori innovativi

25/10/2021

Igor Neri – igor.neri@unipg.it

Grafene

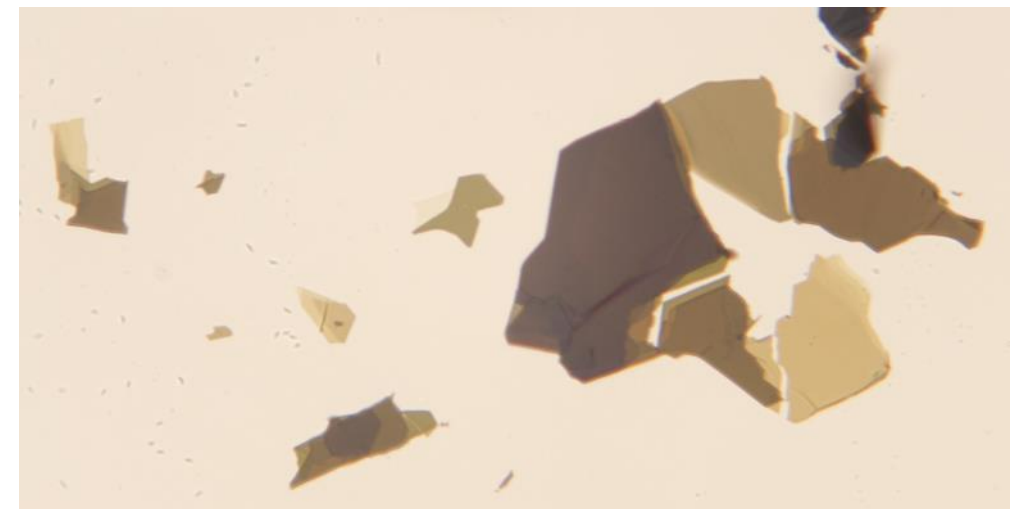
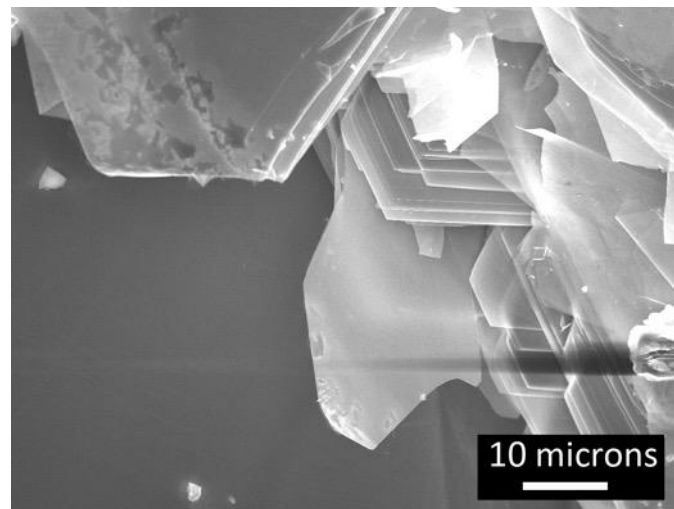
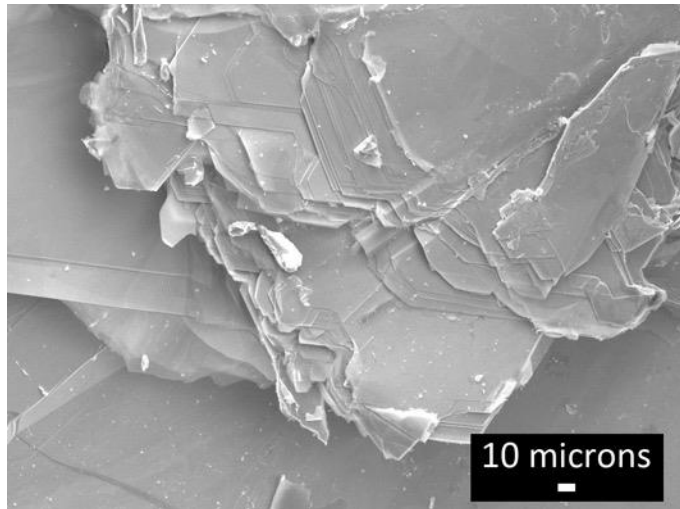
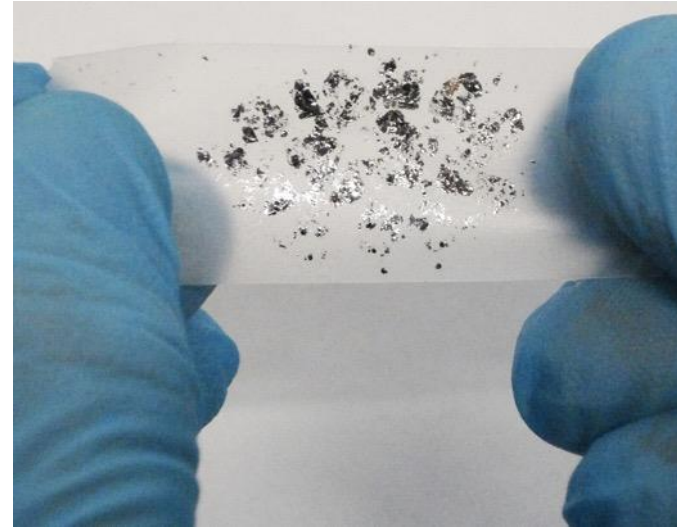
- Auto riparante
- Alta conducibilità elettronica
- Alta conducibilità termica
- Uno dei materiali più resistenti



Outline

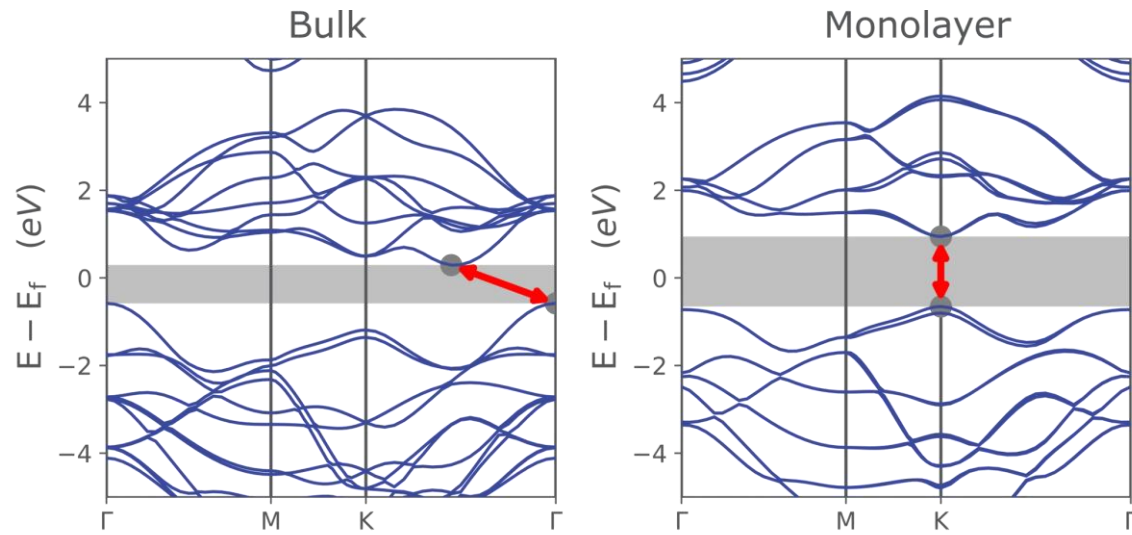
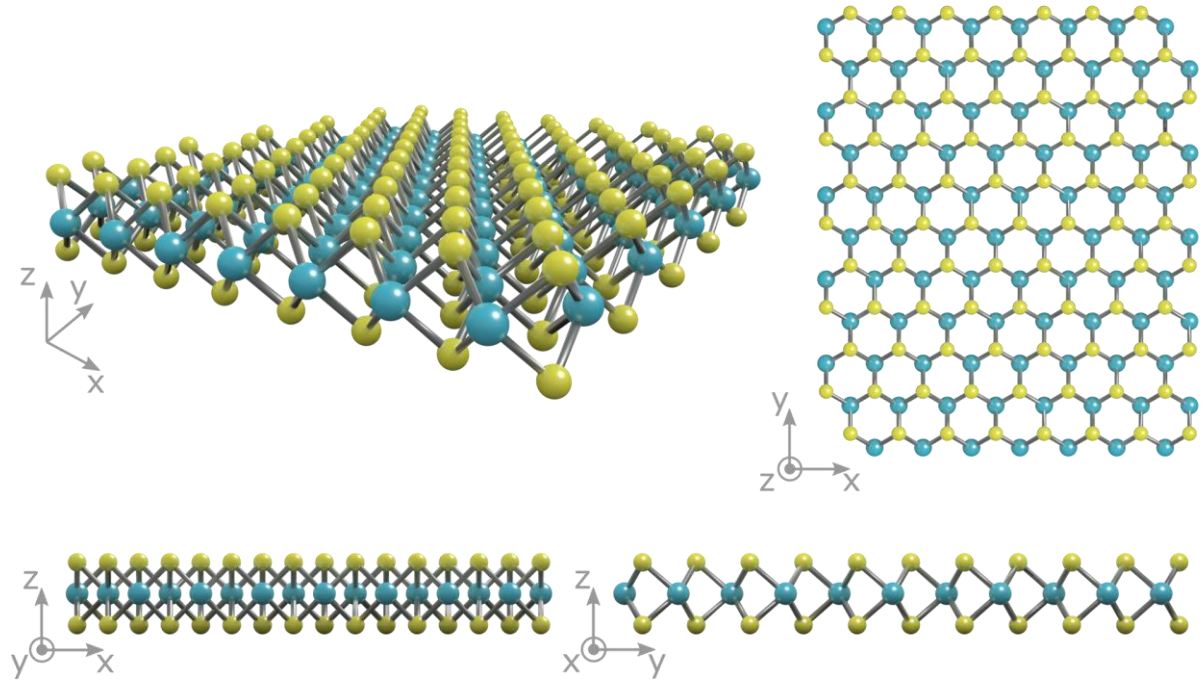
- Fabbricazione
- Simulazioni
- Caratterizzazione
- Applicazioni

Esfoliazione meccanica



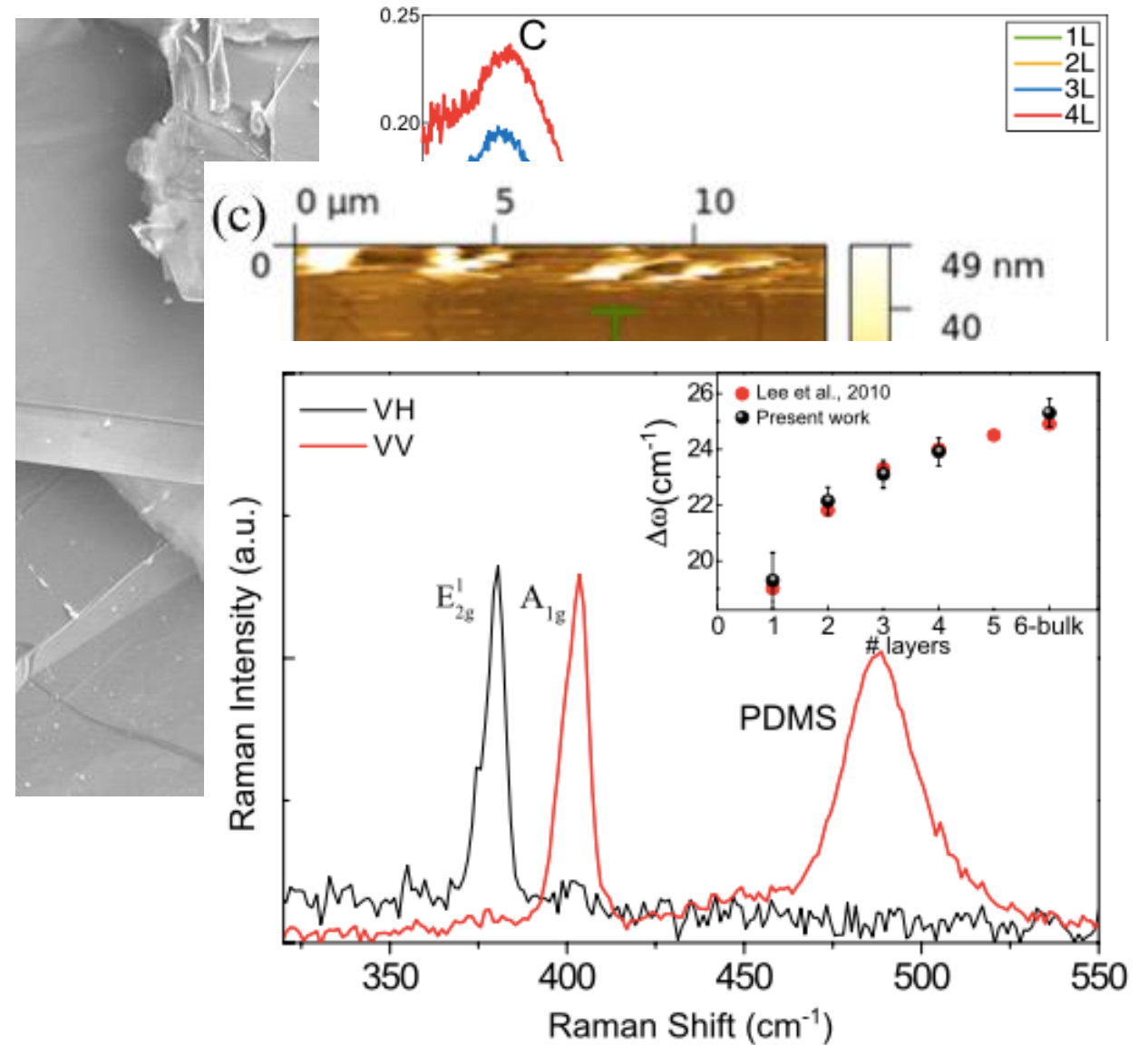
Simulazioni

- Proprietà meccaniche
- Proprietà elettroniche
- Risposta dinamica



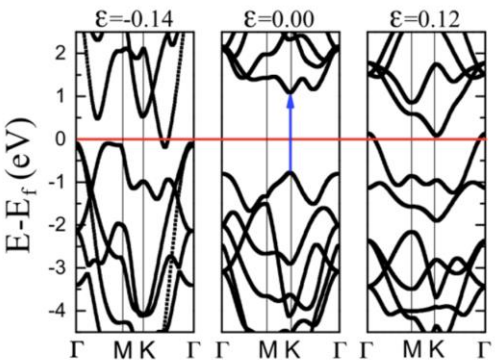
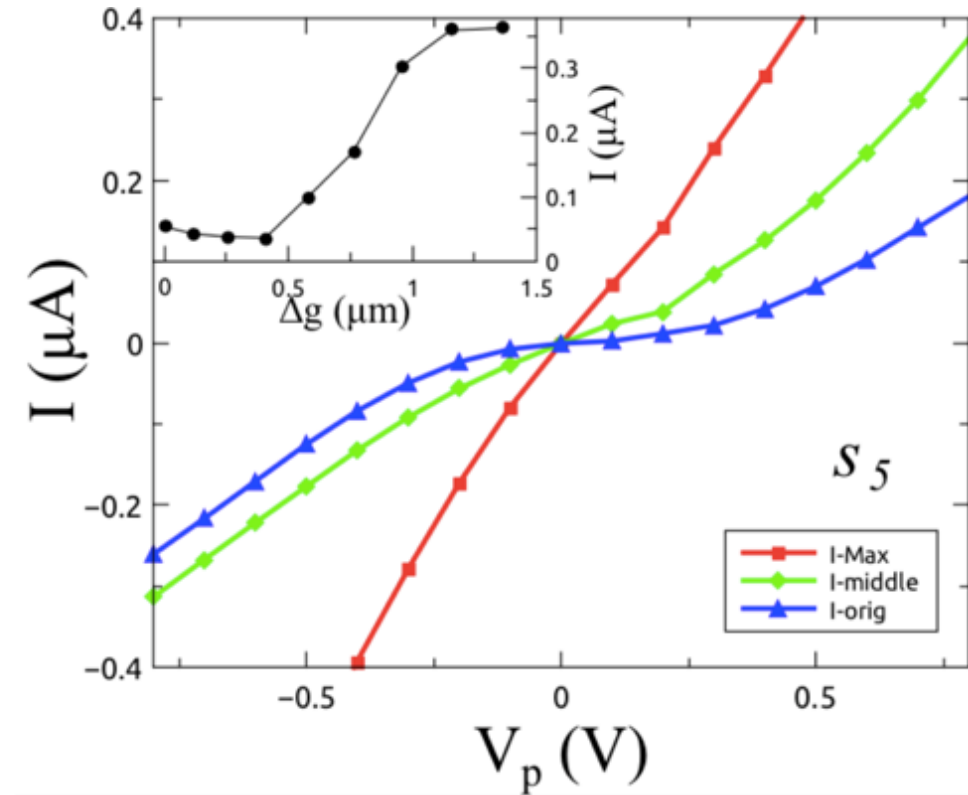
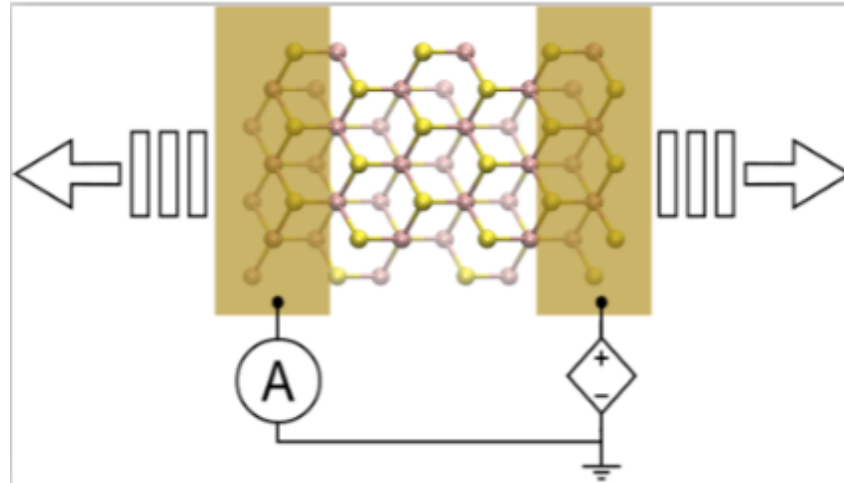
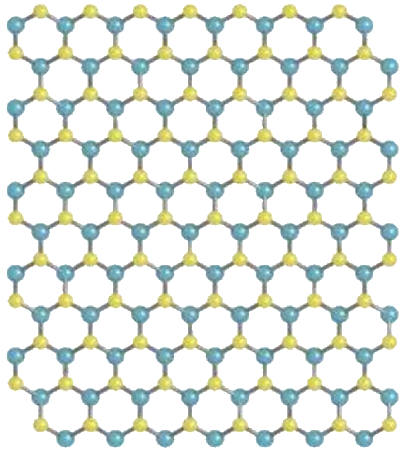
Caratterizzazione

- Microscopia elettronica (SEM)
- Micro-spettroscopia UV-Vis-NIR
- Fotoluminescenza
- Microscopia AFM
- Micro-spettroscopia Raman



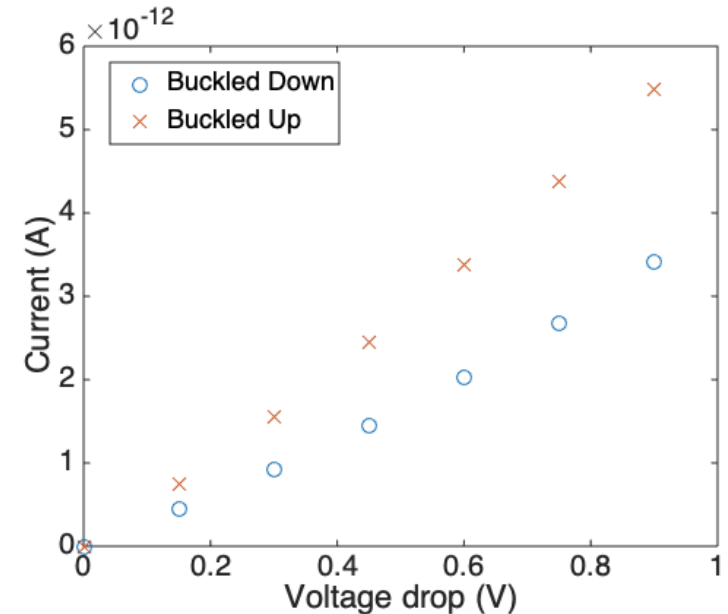
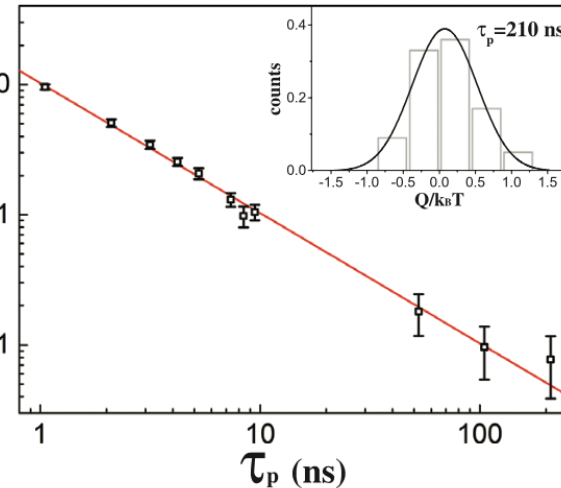
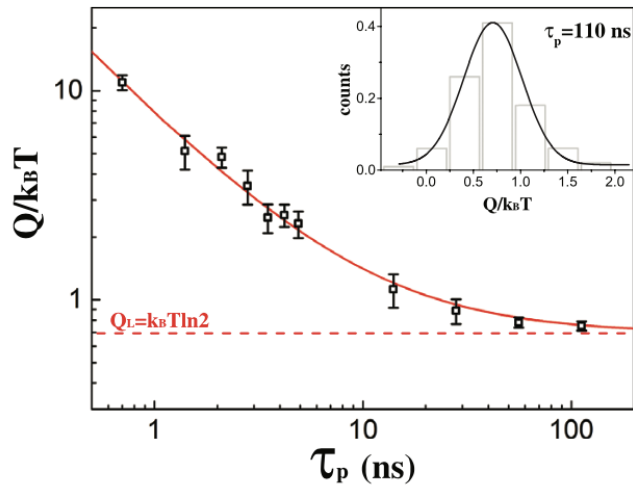
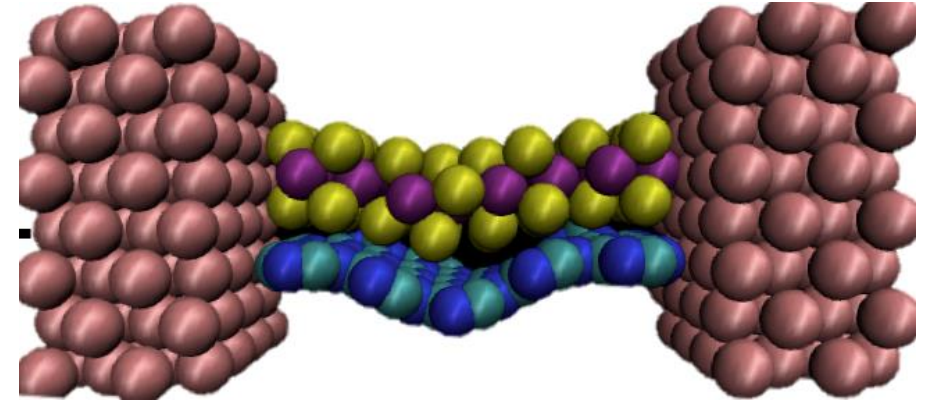
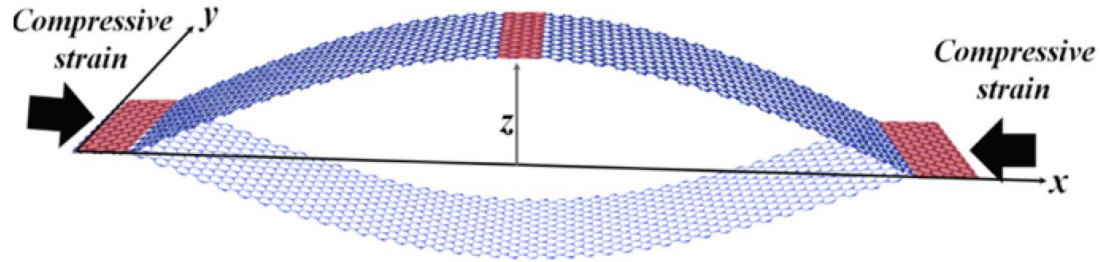
Neri, Igor, et al. Fast MoS₂ thickness identification by transmission imaging." Applied Nanoscience 11.2 (2021): 605-610.

Applicazioni – sensore di deformazione alle nanoscale



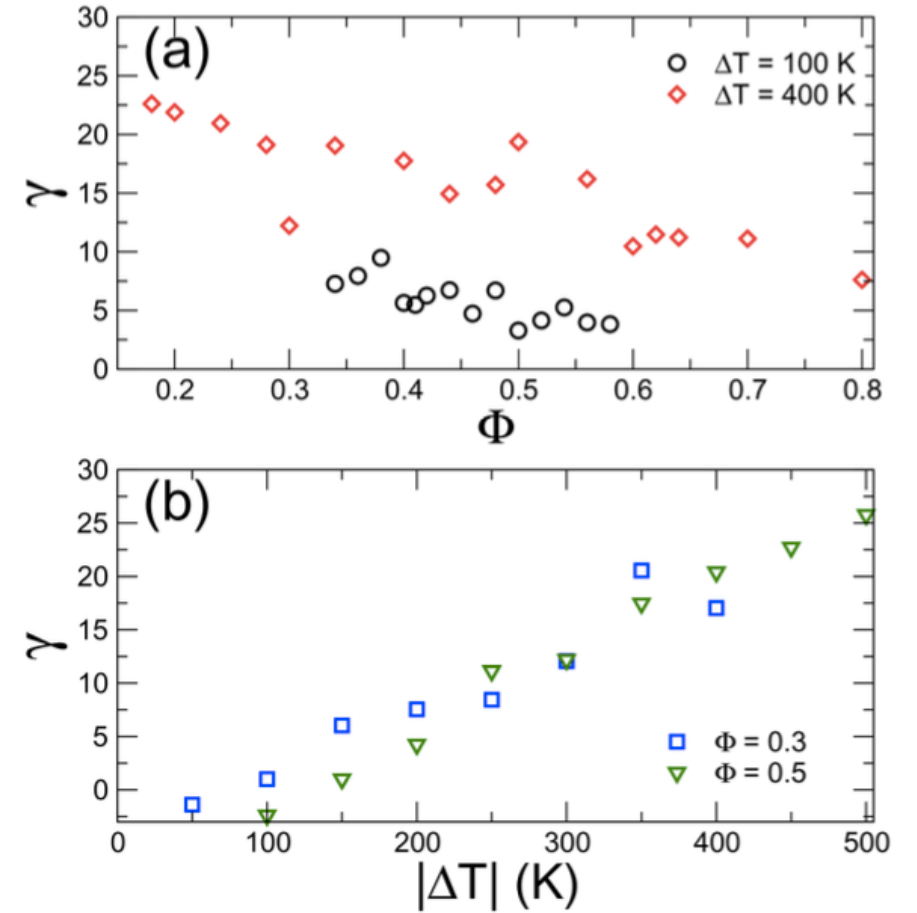
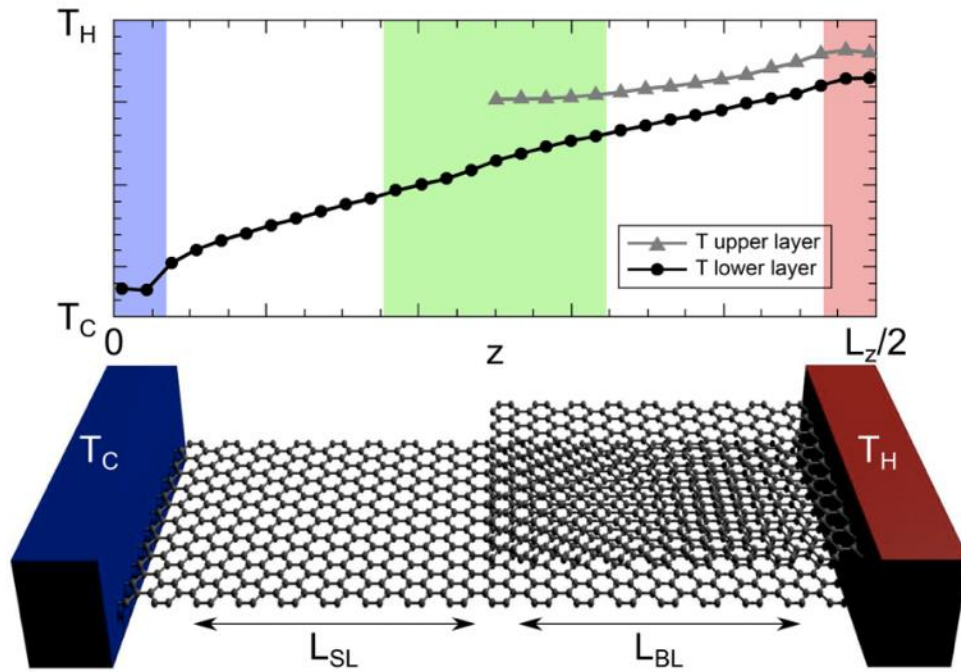
Tunable MoS2 strain sensor, I Neri, M López-Suárez, L Gammaitoni, IEEE Instrumentation & Measurement Magazine 23 (1), 30-33 (2020)
 Electronic transport modulation on suspended few-layer under strain, I Neri, M López-Suárez, Physical Review B 97 (24), 241408 (2018)

Unità di memorizzazione



Neri, I., et al. "Reset and switch protocols at Landauer limit in a graphene buckled ribbon." EPL (Europhysics Letters) 111.1 (2015): 10004.
Piezoresistive memories based on two-dimensional nano-scale electromechanical systems [in preparation]

Diodo termico



Interface driven thermal rectification in a graphene–bilayer graphene junction from nonequilibrium molecular dynamics, M López-Suárez, I Neri, R Rurali, Journal of Applied Physics 124 (22), 224301 (2018)

Grazie per l'attenzione

