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Coláiste na hOllscoile Corcaigh, Éire
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Toxic or not?: Nanomaterials as emerging environmental threats

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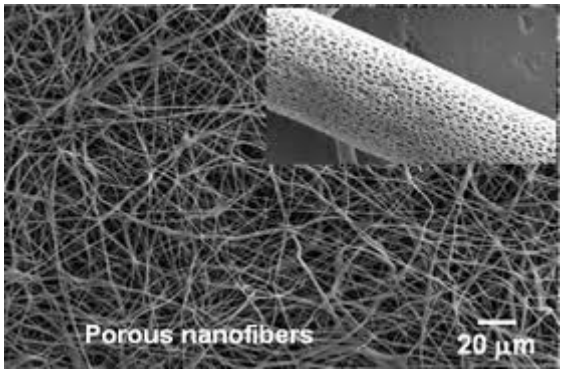
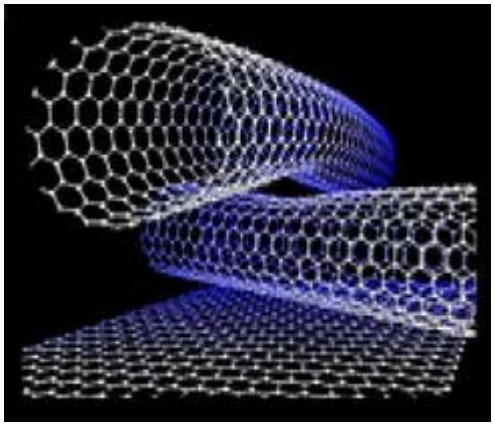
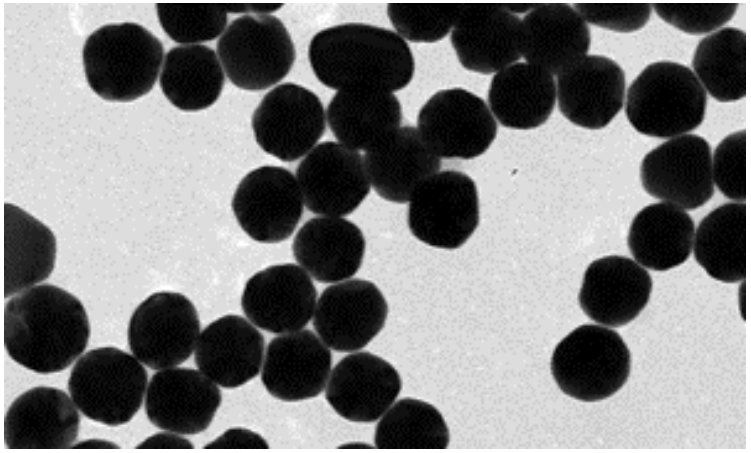
Nanomaterials

- Any dimension < 100nm
  - Nanofibres
  - Nanotubes
  - Nanoparticles



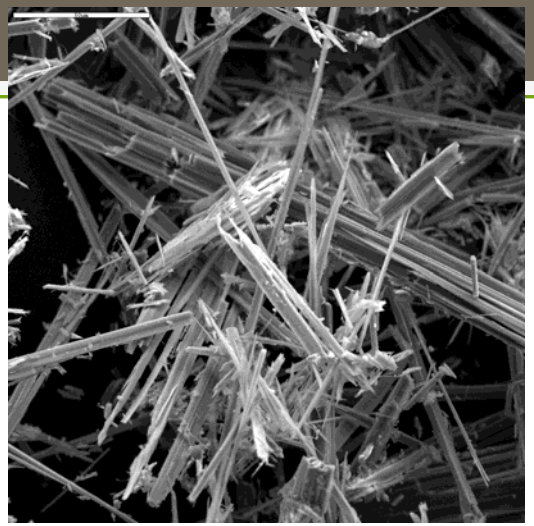




Toxicity of nanomaterials

- High proportional surface area
  - Surface catalysis
- High aspect ratio
- Chemical properties may differ from macromaterial
- Can cross biobarriers
- Can be coated with protein “corona”
  - Enter cells
  - Damage organelles

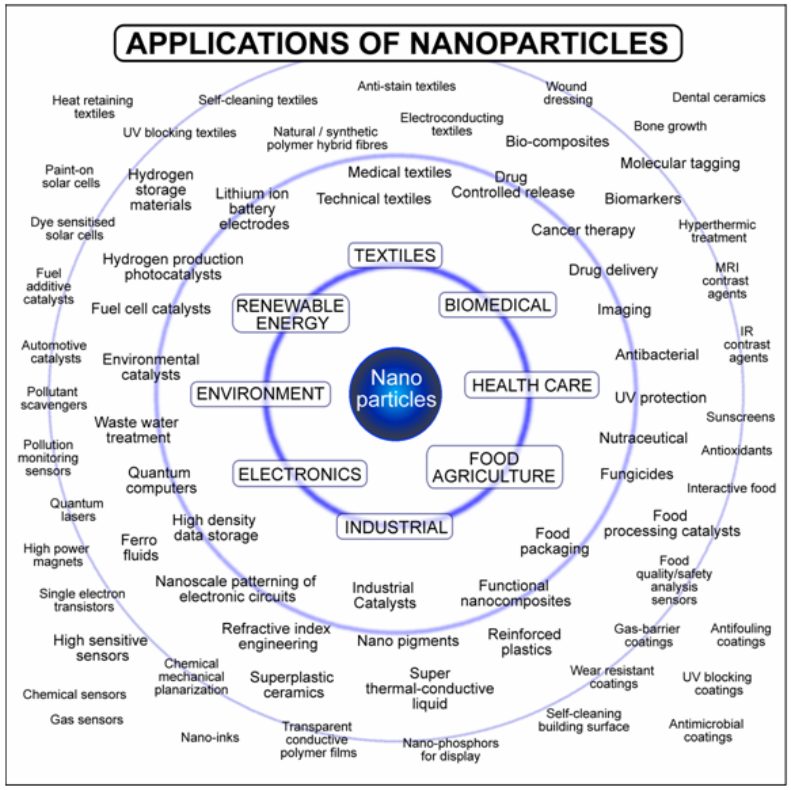
Asbestos



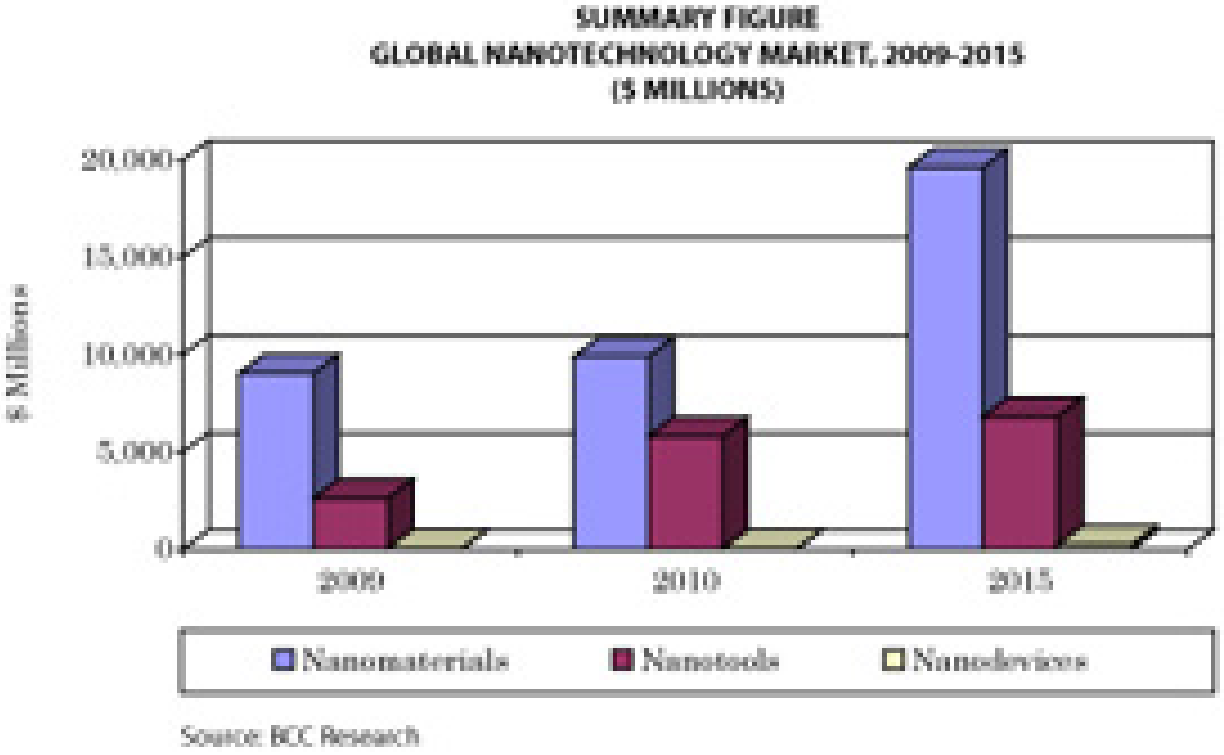
- Naturally-occurring mineral
- Physically similar to carbon nanotubes
- Causes mesothelioma, an occupational cancer
- Simply a consequence of its physical shape, not chemical reactivity
- A warning from History?

Where would you find nanomaterials? Everywhere?

- Sun creams
- Oils and ointments
- Paints
- Car windscreens
- Drug delivery
- Milk / food packaging
- .....

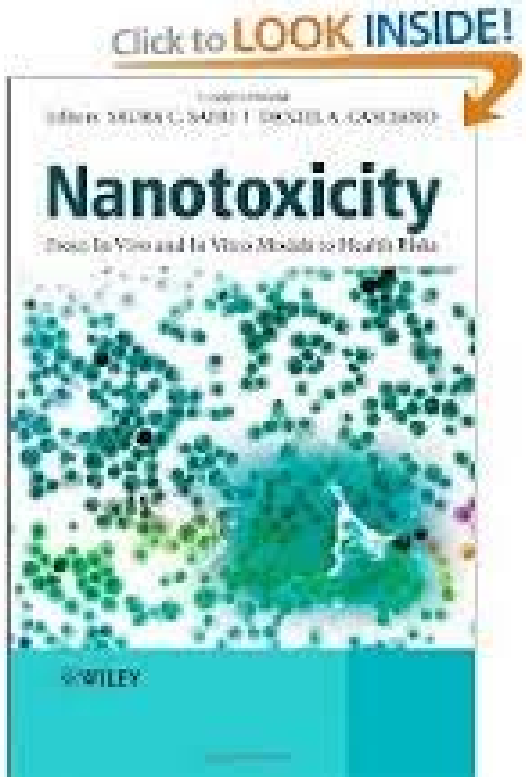


Projected market for nanomaterials: $27bn by 2015



Concern about nanomaterials?

- No toxicology knowl
  - What's a dose?
- Can cross biobarrier
  - Skin
  - Blood brain
  - Lungs
- Increasingly used in lo volume materials
- Will the polluter pay?



Questions

- Does the consumer know the risks?
  - Risk analysis
- Do we really need nanomaterials in low-value products
  - Cost-benefit analysis
- If so, surely the polluter must pay?
  - Civic responsibility
- Why is research funding on applications, not so much on possible downside?

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