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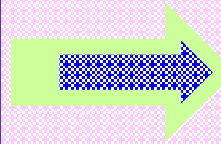
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Research Interests:

Nanoparticles: preparation, characterization, applications

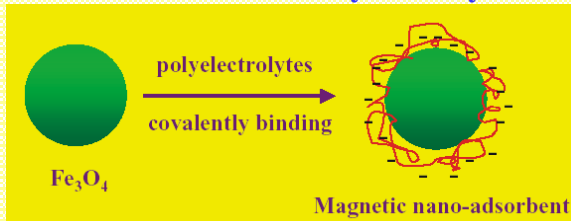
Wet-Chemical Methods
 microemulsion
 solvent-extraction reduction
 chemical oxidation/reduction
 sol-gel, coprecipitation
 hydrothermal/solvothermal
 UV-irradiation
 template-assisted



Nanoparticles
 metals and alloys
 ceramics
 semiconductors
 polymers

Functional composite nanoparticles: fabrication and applications

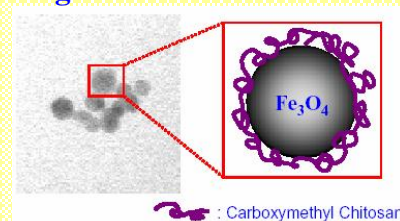
Polyelectrolyte-coated magnetic nano-adsorbent



- ✓ high adsorption capacity
 particularly useful for macromolecules
- ✓ fast adsorption/desorption rates
- ✓ could be magnetically manipulated

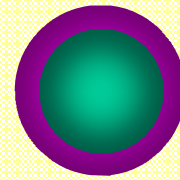
Chitosan-coated multifunctional magnetic nano-carrier

- ✓ anionic and chelating magnetic nano-adsorbents
- ✓ recoverable catalyst support
- ✓ magnetic targeted carrier (gene, drugs)
- ✓ MRI contrast agent



Core-shell metal nanoparticles

- optical: surface plasma energy & Raman scattering
- biomedical: gene transfer, magnetic targeting, therapy
- catalyst
- conducting/EMI filler
- magnetic



core: Ni, Fe
shell: Au, Ag

Biomolecule/drug-nanoparticle conjugates

- enzyme immobilization
- drug delivery/targeting
- gene therapy
- bio-detection
- biolabeling
- bio-separation

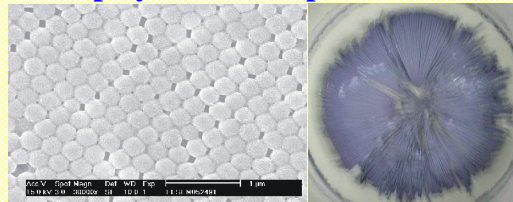


Nanoparticles
Fe@Au, Ni@Au
Fe₃O₄

Biomolecules/drugs
proteins, enzymes,
DNA, drugs

Metal-coated polymer microspheres

- conducting/EMI filler
- photonic crystal
- magnetic materials
- catalyst
- SERS

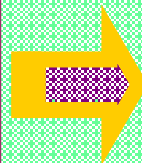


PS@Ni

Nanostructured composite films: preparation and characterization

Fabrication

- sol-gel
- dispersion/casting
- layer-by-layer self assembly
- electrophoretically deposition



Applications

- surface coatings/modification
- optical devices (UV/VIS/NIR)
- optoelectronic devices
- conducting devices
- electrochemical devices
- photo/catalytic devices
- biosensors

Others

- Process R&D for nanoparticle-dispersed functional textile
- Membrane separation processes
- Enzyme technology, bioreactor and bioseparation
- Solvent extraction and ion exchange