



Superparamagnetic iron oxide nanoparticles (SPION) – their synthesis and applications

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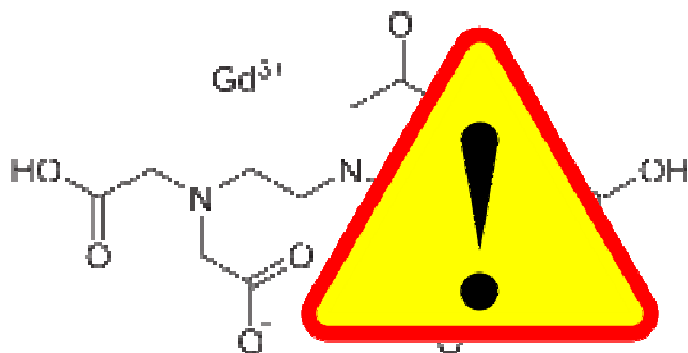
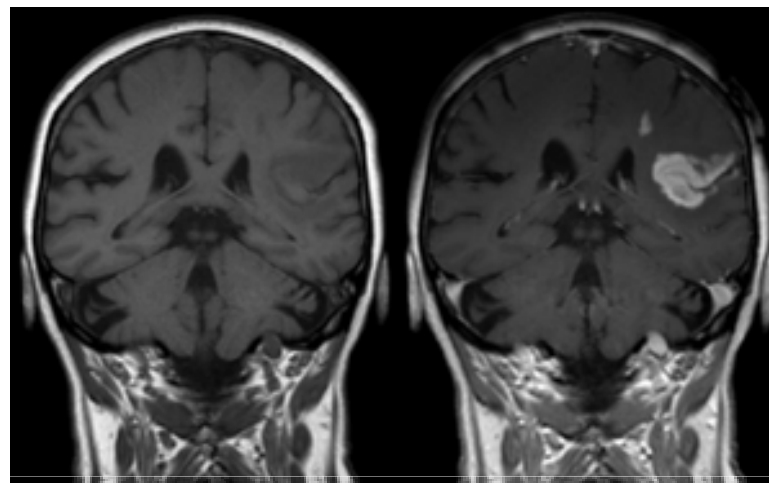
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Plan of presentation:

1. Magnetic Resonance Imaging (MRI) and contrast agents
2. Superparamagnetic iron oxide nanoparticles (SPION)
3. Synthesis and characterization of the material
4. Conclusions

Magnetic Resonance Imaging (MRI) and contrast agents

- ▶ MRI:
 - ▶ noninvasive diagnostic technique
 - ▶ visualization of detailed internal structures
 - ▶ water molecules are used



- ▶ Contrast agents:
 - ▶ a group of contrast media used to improve the visibility of internal body structures or their defects in MRI
 - ▶ commonly used contrast agents are made of Gd compounds

Superparamagnetic iron oxide nanoparticles (SPION)

▶ Advantages:

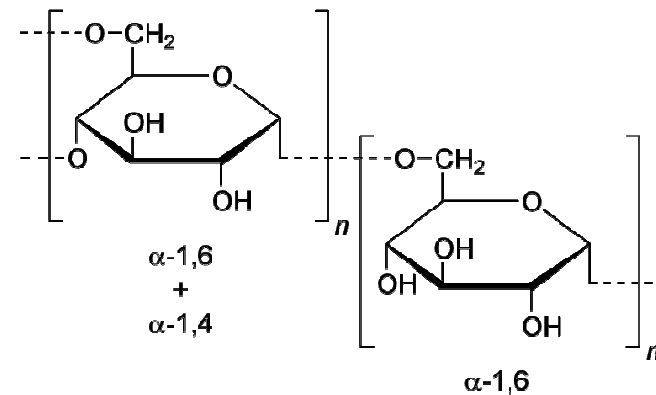
- ▶ non-toxicity
- ▶ biodegradability
- ▶ magnetic properties
 - superparamagnetism



▶ Problems:



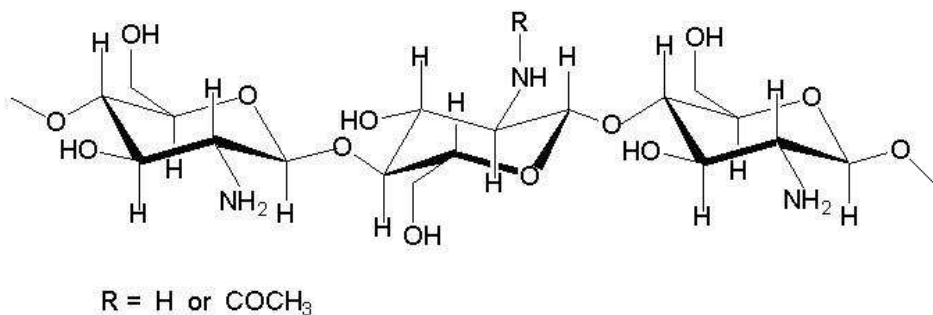
- ▶ unstability
- ▶ non-biocompatibility



Synthesis and characterization of the material

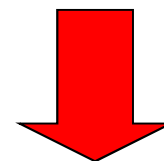
▶ Synthesis:

1. co-precipitation iron oxide nanoparticles with cationic chitosan
2. coating by anionic chitosan



▶ Properties of the material:

- ▶ stable in water
- ▶ small size, about 12 nm
- ▶ superparamagnetic
- ▶ good value of relaxivity
- ▶ biocompatible (pretests on human blood)



application: contrast agent for MRI

Conclusions:

- ▶ Obtained SPION modified with ionic chitosans have good properties to use them as contrast agents for MRI.
- ▶ The product, its synthesis and application have been patented.
- ▶ Further modifications of the surface of SPION are in progress.

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Thank you for your attention