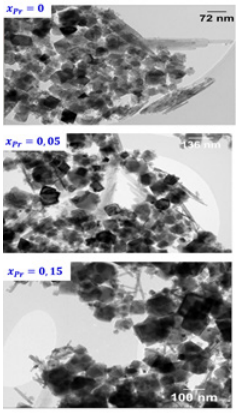
PROCESS FOR PRODUCING MAGNETIC NANOCOMPOSITES BASED ON IRON OXIDE

Process for producing iron-based magnetic nanocomposites and easily choose their magnetic category (soft, semi-hard, hard) while using the same composition of precursors.

ERGANEO
L'AVENIR EST FAIT D'AUDACE

PRESENTATION

There are a multitude of methods for producing magnetic nanoparticles with a given magnetic behavior (paramagnetic, ferromagnetic, etc.) and a given magnetic category (soft, semi-hard, hard). But for the same composition of precursors and a given process, there is still no simple and effective way to modulate the magnetic category. Based on co-precipitation of precursors and a hydrothermal and/or solvothermal synthesis, this innovative production process allows to easily choose the magnetic category (soft, semi-hard, hard) of the nanocomposites while using the same composition of precursors.



Example with one sample : cubic particles and presence of nanotubes (the second phase)

Nanoparticles - Ferrites - Solvothermal
Hydrothermal - Magnetic

APPLICATIONS

- Ferrofluids, magneto-rhéological fluids
- Electromagnetic shielding
- Water/soil traitement
- Catalysis
- Energy storage
- Therapeutics and diagnosis
- Antibacterial activity

DEVELOPMENT PHASE

- TRL 3-4
- Looking for technical specifications from an industrial company to upscale the technology

COMPETITIVE ADVANTAGES

- Possible to obtain different magnetic materials (soft, semi-hard, and hard) while using the same composition
- The coercive field is adjustable according to the synthesis conditions.
- High purity (only presence of Co, Fe, Pr, and O based on an EDX analysis by MET)
- Large range of particle size possible : from 1nm to 500nm or more
- High Specific Surface Area (250-750 m^2/g with 5nm nanospheres, depending on the particles shape)
- Low bulk density (< 5 g/cm3)
- No theoretical limit for the injection of these NPs into another material (just below a certain temperature to avoid loss of the secondary phases)

INTELLECTUAL PROPERTY

Patented technology

CONTACT

+33 (0)1 44 23 21 50
industriels@erganeo.com
Ref. project : 592