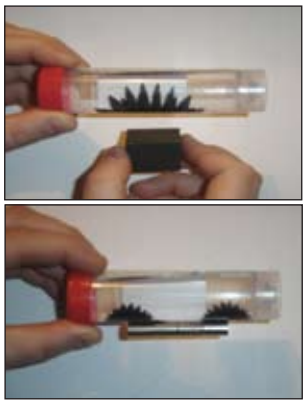
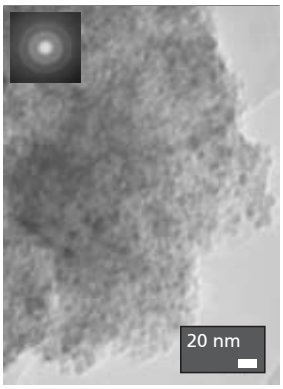
LABORATORY FOR NANOTECHNOLOGY

Over the last two years an immense effort has been devoted:

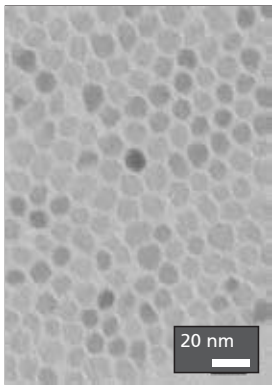
- To the preparation of MAGNETIC FLUIDS (FERROFLUIDS)
  - Magnetic fluids consist of (superpara) magnetic nanoparticles with a narrow size distribution of around 10 nm, coated with a thin film of inorganic or organic dispersant and dispersed in a carrier liquid (water, oils, hydrocarbons, etc.).
  - Magnetic fluids represent a new class of magnetic materials with a wide range of technological applications (for sealing, dumping, cooling, bearing, sensors, loudspeakers, etc.) and in biomedicine for diagnostic and therapeutic applications (MR imaging, targeted drug delivery, hyperthermia, separation/selection, etc.).



Magnetic fluid



Uncoated nanoparticles (high degree of agglomeration)



Solution of coated nanoparticles (magnetic)

- We are also experienced in the preparation of (MONODISPERSED) ANOTHER KINDS OF NANOPARTICLE MATERIALS with a narrow size distribution below 100 nm using various preparation methods (co-precipitation in aqueous solutions, co-precipitation in microemulsions, etc.).

Main equipment

- LabMax (Mettler Toledo) - An Automatic Lab Reactor for synthesis in a litre range (reproducible synthesis, 24-hour operation in chemical research, kilogram, scale-up and product development)
- BET (Tristar 3000, Micromeritics) - Surface Area and Porosimetry Analyzer
- Potenciometric Titrator (DL50 Graphycs)
- Disperser/Homogenizer (Polytron 3100)
- VSM (Vibrating Sample Magnetometer – Lakeshore)
- XRD (Bruker AXS Endeavor D4)
- Rheometer (MCR-301 Anton Paar)
- etc.

BET (Tristar 3000, Micromeritics)

LabMax Reactor

Potenciometric titrator

Disperser/Homogenizer

LABORATORY FOR EM MEASUREMENTS

The field of work of Laboratory for electromagnetics is measurement, theoretical analysis and modelling of interaction of electromagnetic fields with matter. Our main goal is development of new composite and homogeneous materials for electronic industry and examination of new applications for these materials.

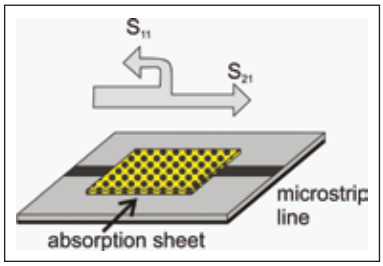
Main focus is currently on microwave frequency range and materials with significant magnetic and/or dielectric losses in this range. These materials can be used for:

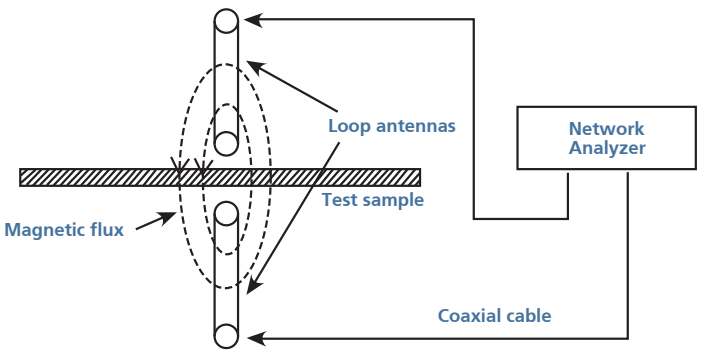
- electromagnetic absorbers for near-field and/or far-field electromagnetic radiation
- suppressors of conducted electromagnetic noise
- enhancement of RFID systems

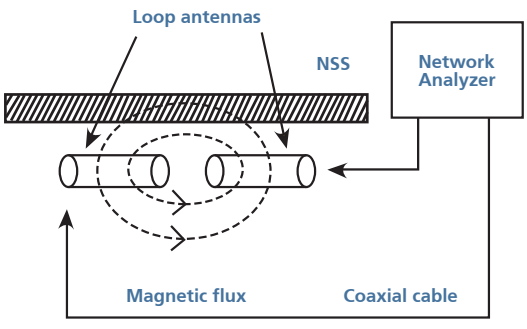
with specific functions like reducing crosstalk and coupling between system elements, attenuation of background EM noise, general improvement of electromagnetic compatibility, suppression on noise-conducting pathways, prevention of wireless-signal leakage, and proper frequency coupling and increased range for RFID reader/tag systems in vicinity of metal objects.

Facilities of Laboratory for electromagnetics include:

- system for electromagnetic characterization of materials in frequency range from 1 MHz to 20 GHz
- system for characterization of far-field absorbers, in line with MIL-A-17161D and IEEE 1128-1998 standards
- system for characterization of near-field absorbers, in line with IEC standard draft
- system for evaluation of RFID reader/tag assembly
- software for theoretical calculations and modeling (MathWorks Matlab, Comsol Femlab)







R & D Centre for Nanotechnologies on the field of Magnetic Materials and Composites

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