

## NOVEL TECHNIQUE TO ENHANCE THE SECURING LEVEL OF SECURITY PAPER USING THE SUPERPARAMAGNETIC FINGERPRINT OF MAGNETIC NANOPARTICLE DISPERSIONS → NANOMAG-SECURITY PAPER

### Goal of the project

The continuous diversification of the paper securing techniques is one of the most important ways to erect fences against forgery attempts. The project aims to expand the diversity of high tech means for paper securing. The general objective of the project is to elaborate a new paper securing technique based on the superparamagnetic fingerprint of magnetic nanoparticles made of oxide compounds.

### Short description of the project

The objective **is to elaborate a new paper securing technique** based on the superparamagnetic fingerprint of the magnetic nanoparticles.

### Project implemented by

- Romanian Academy – Timisoara Branch (CO)
- SC CEPROHART SA (P1)
- SC ROSEAL SA Odorheiu Secuiesc (P2)
- SC Datronic – NCIP SRL (P3)
- National Institute of R&D for Izotopic and Molecular Technologies Cluj-Napoca (P4)
- Politehnica University of Timisoara (P5).

### Implementation period

01.07.2014 – 30.06.2016

### Main activities

- elaboration of superparamagnetic paper assortments with
  - low security level, using poly-disperse magnetic nanoparticles
  - high security level, using bi-disperse magnetic nanoparticles
  - white color, using core-shell (core/magnetic, shell/polymer) particles
- elaboration and testing the authentication method by static and dynamic magnetometry

### Results

- methods for synthesis and characterization of oxide magnetic nanocomposites
- methods for elaboration and validation of magnetic loaded papers
- first instance validation of magnetic loaded papers

### Financed through/by

Executive Unit for Financing Higher Education, Research, Development and Innovation (UEFISCDI)

### Applicability and transferability of the results

The new method of securing paper using the superparamagnetic nanoparticles can be transferred to SC Cephart SA Braila. The transfer will contribute to:

- diversification of the product made in the national paper industry with simple brown paper secure and secure complex white paper,
- orientation of national industry to obtain a special paper grade with high complexity,
- increase the security level of specialty papers, difficult to fake on the internal market
- reduce the imports of security paper
- increase output and thus sales of security paper from Cephart.

### Research centre

Research Centre for Engineering of Systems with Complex Fluids – Laboratory of Rheology and Magnetometry, from Politehnica University of Timisoara.

### Research team

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