Hochschule Kaiserslautern
University of Applied Sciences

Applied Research Center
Integrated Miniaturised Systems

IMS

Micro- and nanostructured hard magnetic materials and components for microtechnological applications

Permanent magnets are used more and more in microtechnical products, especially for data storage, in energy and sensor technology as well as for transport and separating processes (e.g. in microfluidics). This large market is mostly served by rare earth magnets or by ferrite-based materials. The limited availability of the rare earth metals has increased the demand for alternative, rare earth-free magnetic materials. In addition, the increasing demands on the micromagnetic sensors and measuring systems in terms of lower space requirements, higher accuracy and measuring sensitivity as well as areas of application in industrial environments require not only integrated manufacturing processes, but also increased requirements on the materials themselves.

This is the subject of the interdisciplinary project of three research groups at the University of Applied Sciences Kaiserslautern. Using hard magnetic Co alloys as an example, the magnetic performance of the material is to be adjusted by the manufacturing process. The field of application is magnetic field sensor technology, which can be used to measure geometric parameters or defects in materials.

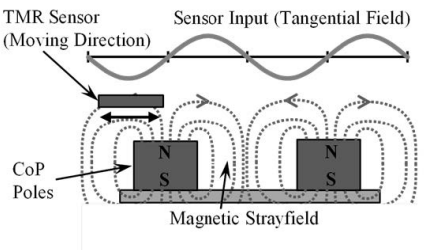

Figure 1: A schematic representation of the principle of position measurement using a TMR sensor.

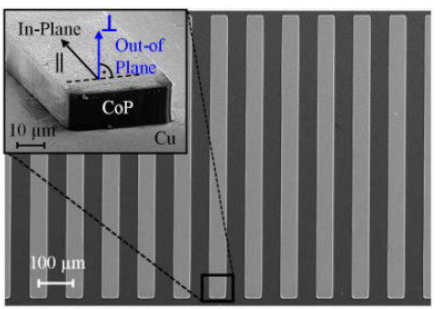

Figure 2:
CoP scales (top view; REM).

Projectduration:
09/2021 – 08/2025

Project management:
Prof. Dr. Monika Saumer
Hochschule Kaiserslautern
University of Applied Sciences
Amerikastrasse 1
66482 Zweibrücken
Germany

phone: +49 631/3724-5420
e-mail: Monika.Saumer@hs-kl.de

Principal Investigators:
Prof. Dr. Peter Starke (HS KL)
Prof. Dr. Sven Urschel (HS KL)

Prof. Dr. Dr. Rolf Hempelmann (UdS)

IMS

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