



ÓBUDAI EGYETEM
ÓBUDA UNIVERSITY

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Doctoral School on Materials Sciences and Technologies

Development of composite materials for the electromagnetic interference (EMI) shielding

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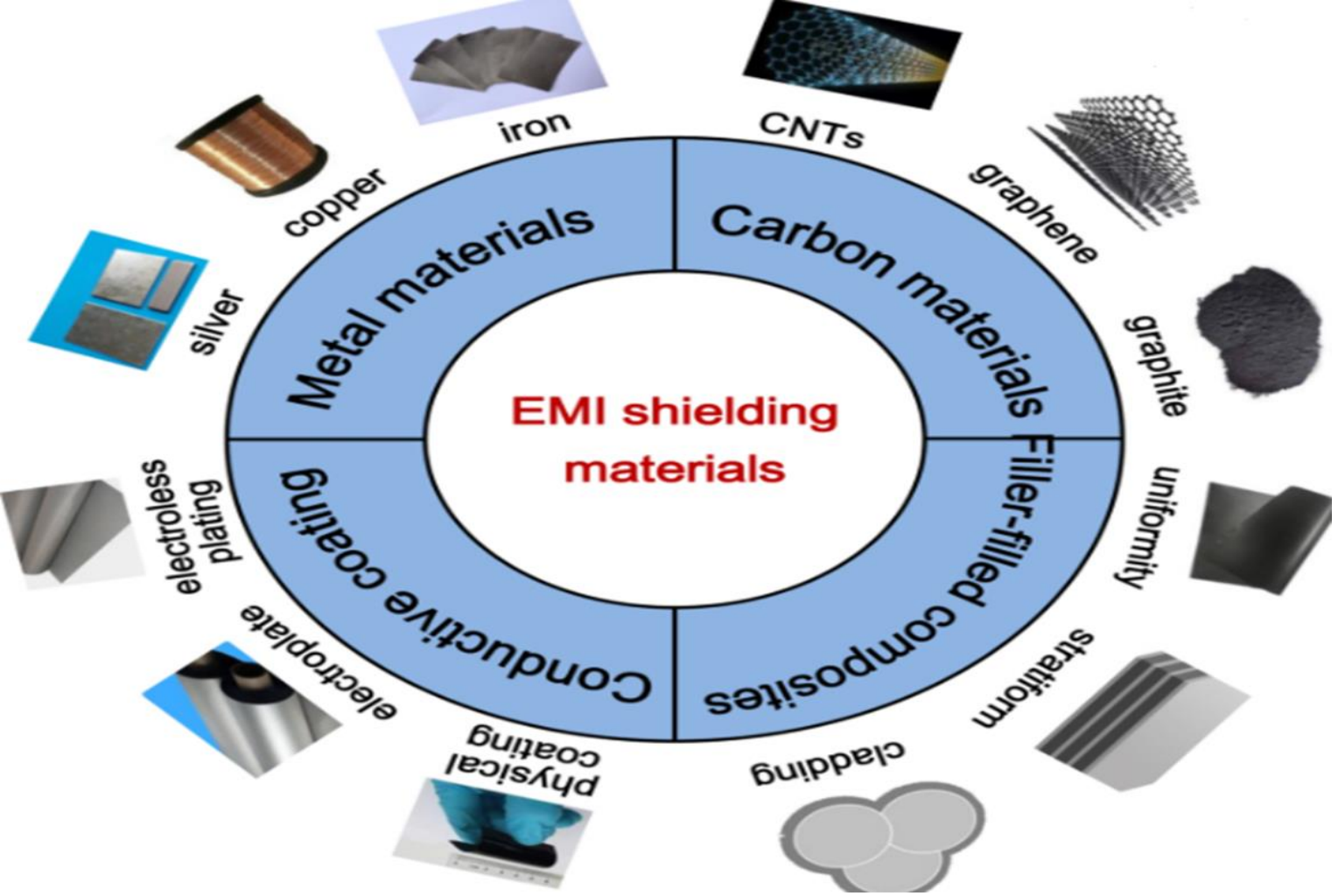
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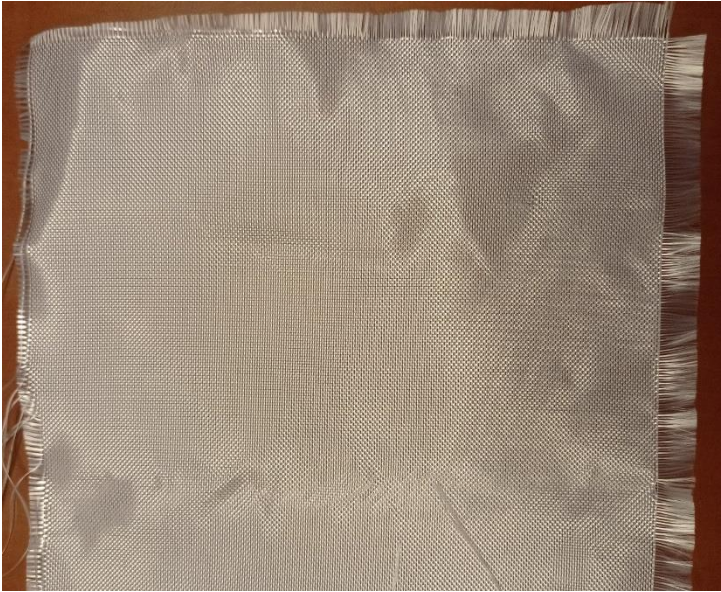
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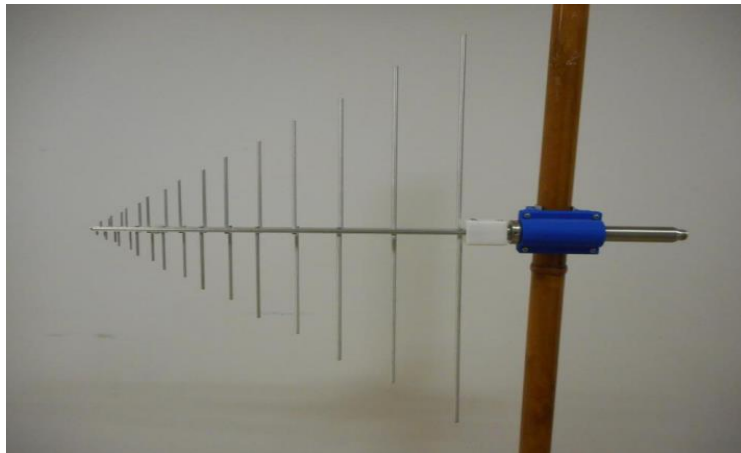
Introduction



The chosen material for the electromagnetic shielding test



Devices



The measurement was conducted in the following order

The electric radiation at vertical and horizontal polarization

No shielding, ER_V	No shielding, ER_H
3mm galvanized ferrite sheet ER_V	3mm galvanized ferrite sheet ER_H
Copper sample ER_V	Carbon type1 sample ER_H
Copper sample ER_V	Copper sample ER_H
Carbon fiber type2 ER_V	Carbon fiber type2 ER_H
Carbon fiber type3 ER_V	Carbon fiber type3 ER_H
Fiberglass sample ER_V	Fiberglass sample ER_H

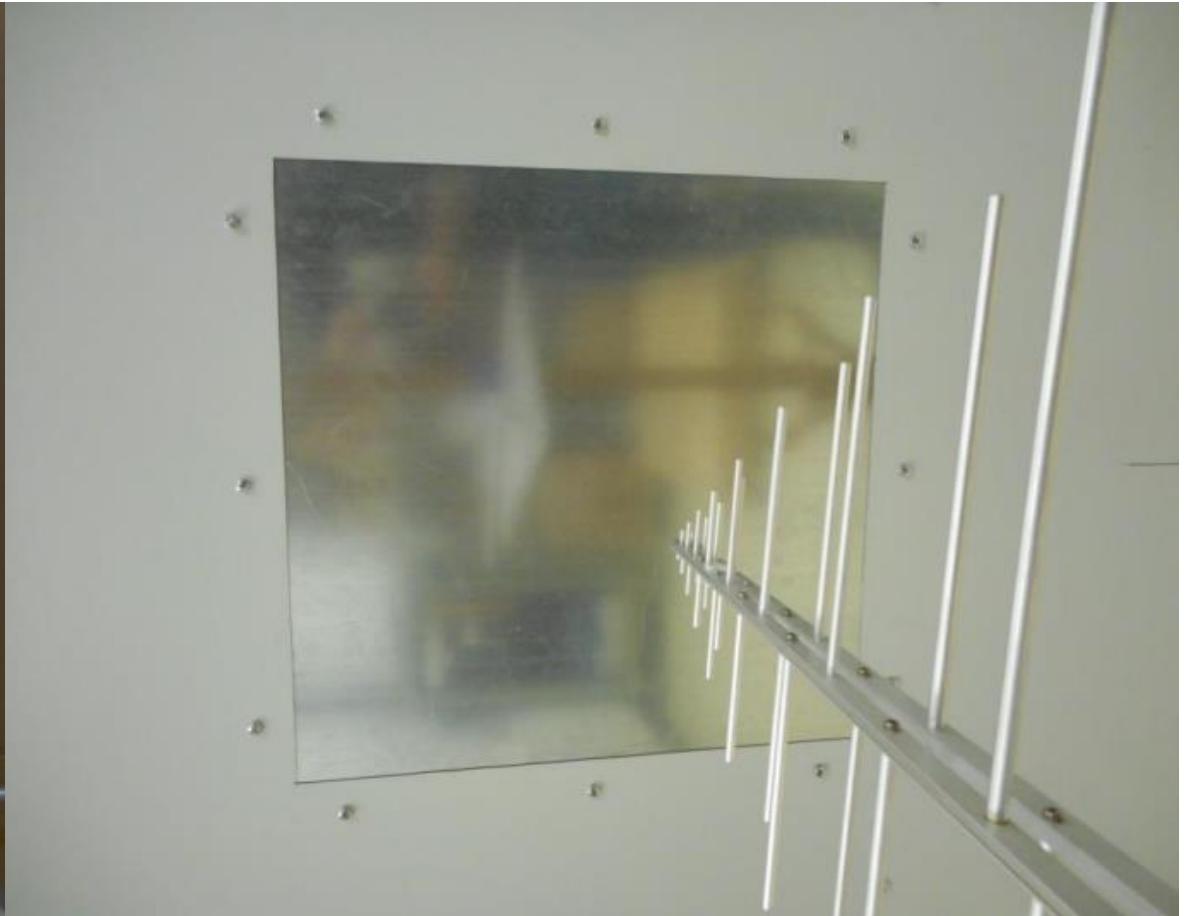
The magnetic field measurement



No shielding ER_V and ER_H



3mm galvanized ferrite sheet ER_V and ER_H



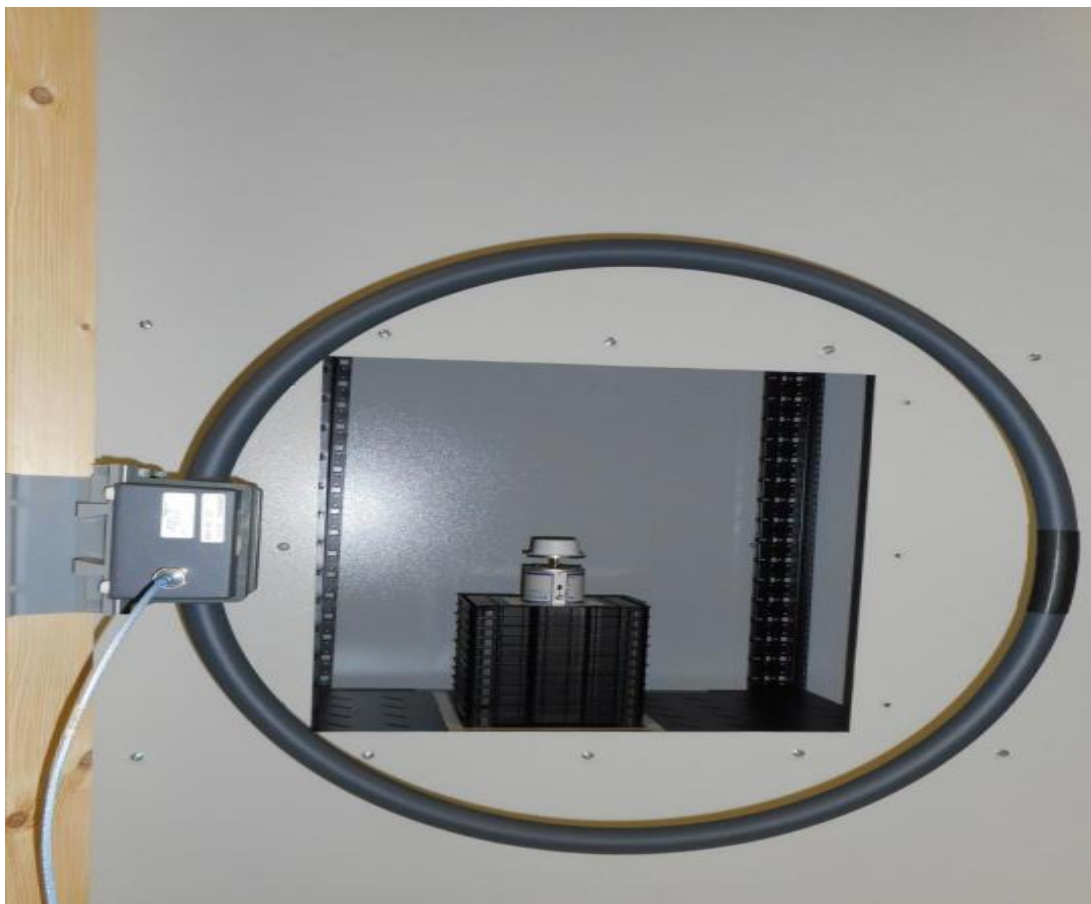
Copper sample ER_H and ER_V



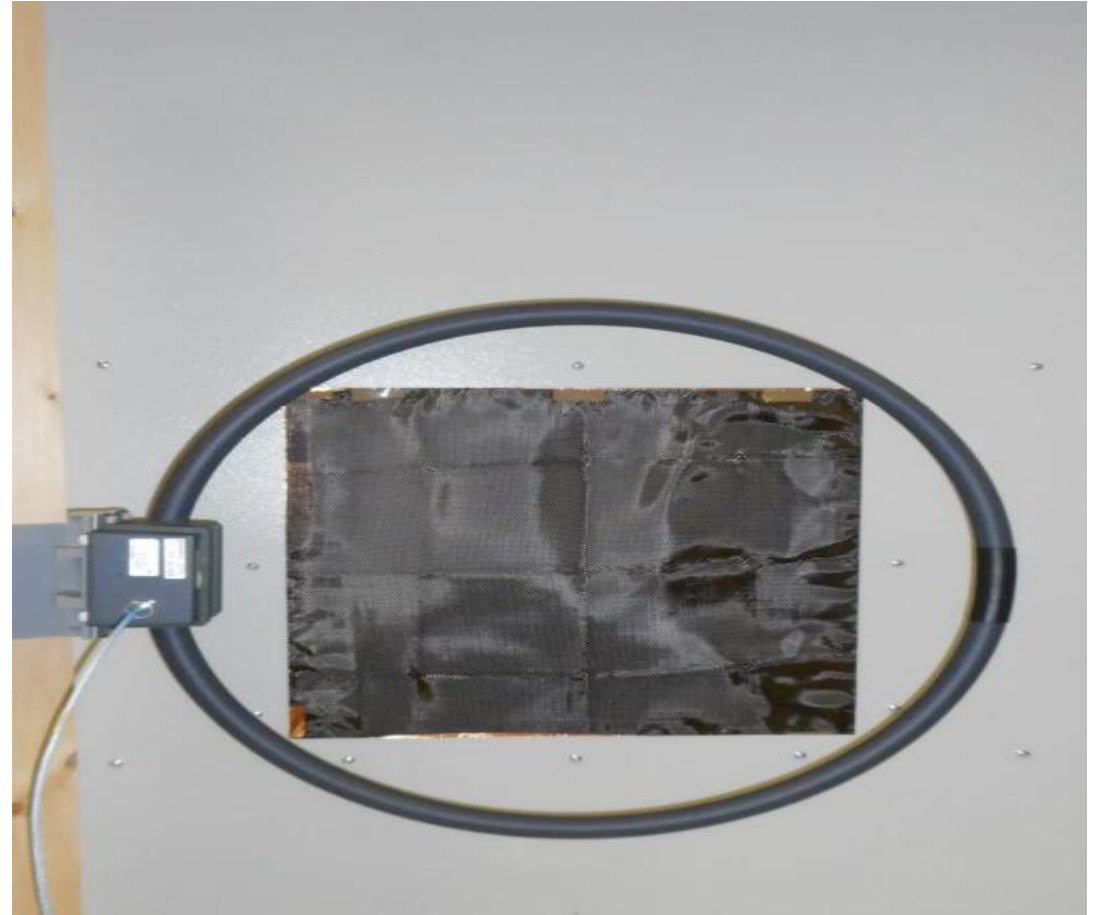
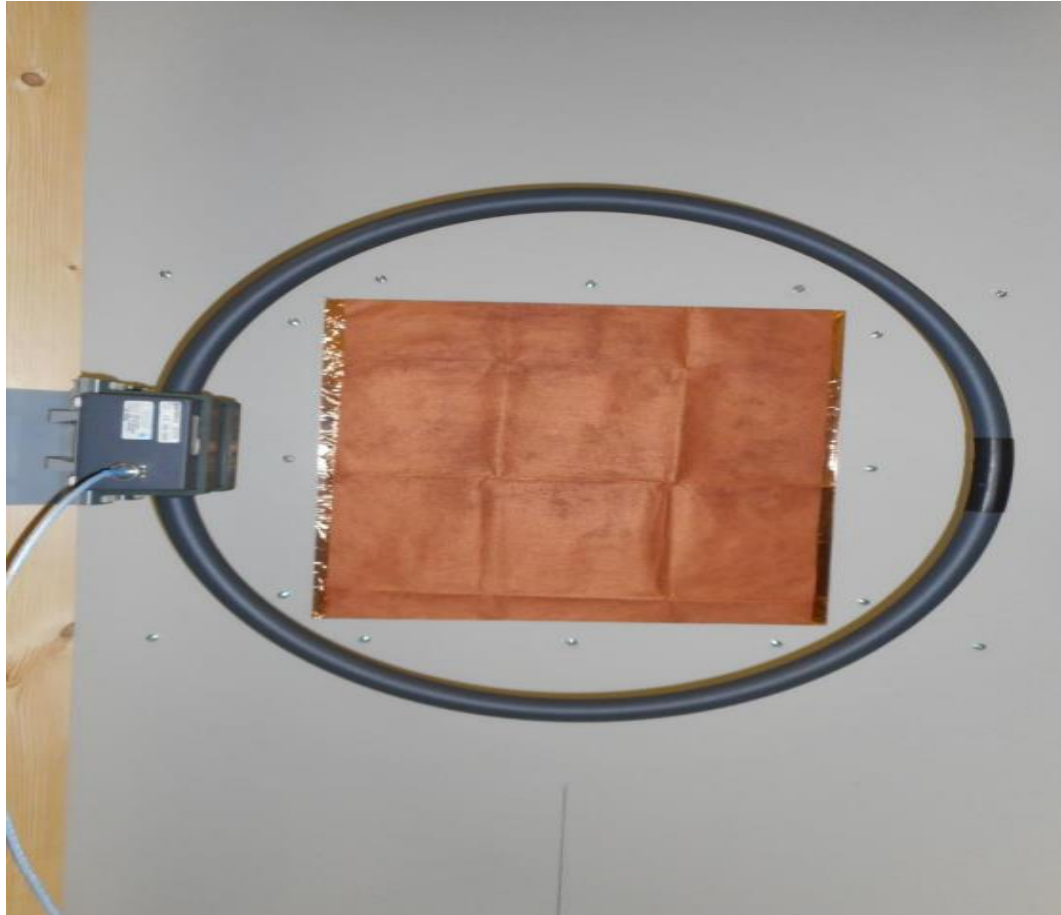
Carbon sample ER_H



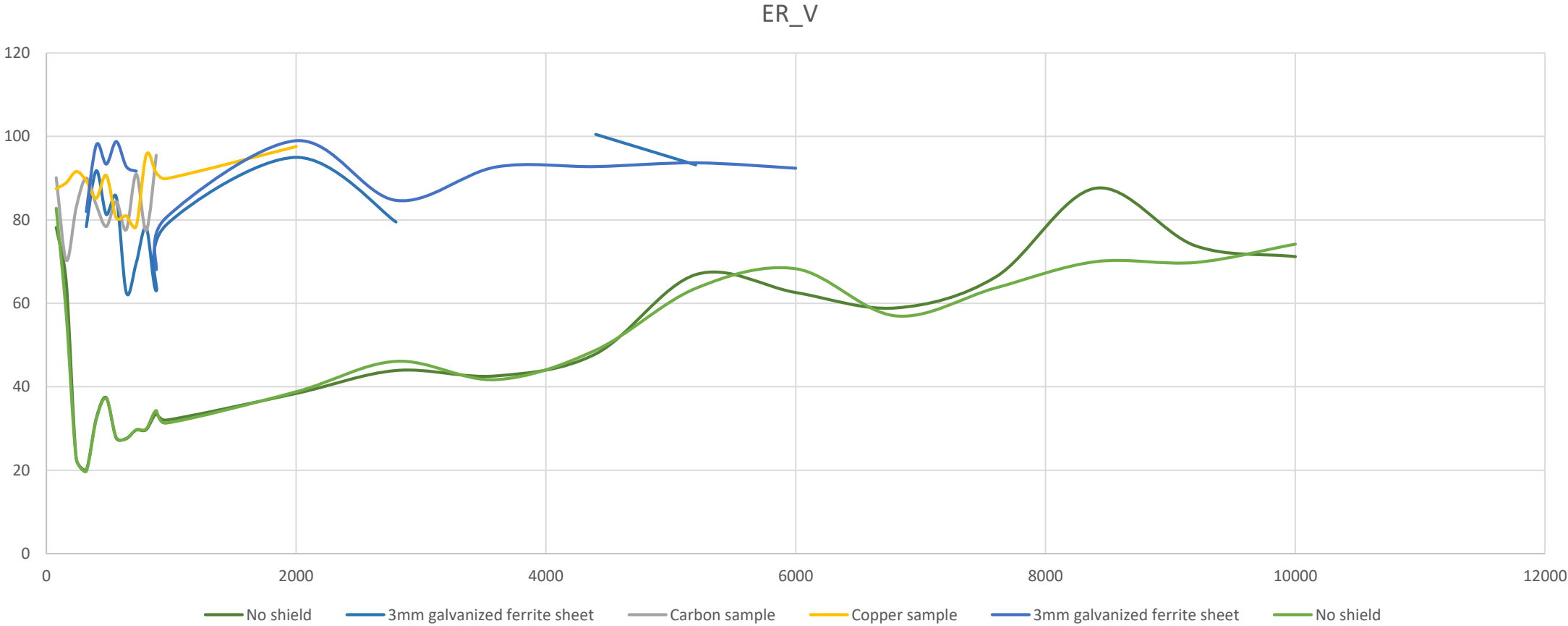
No shielding MR_V and 3mm galvanized ferrite sheet MR_V



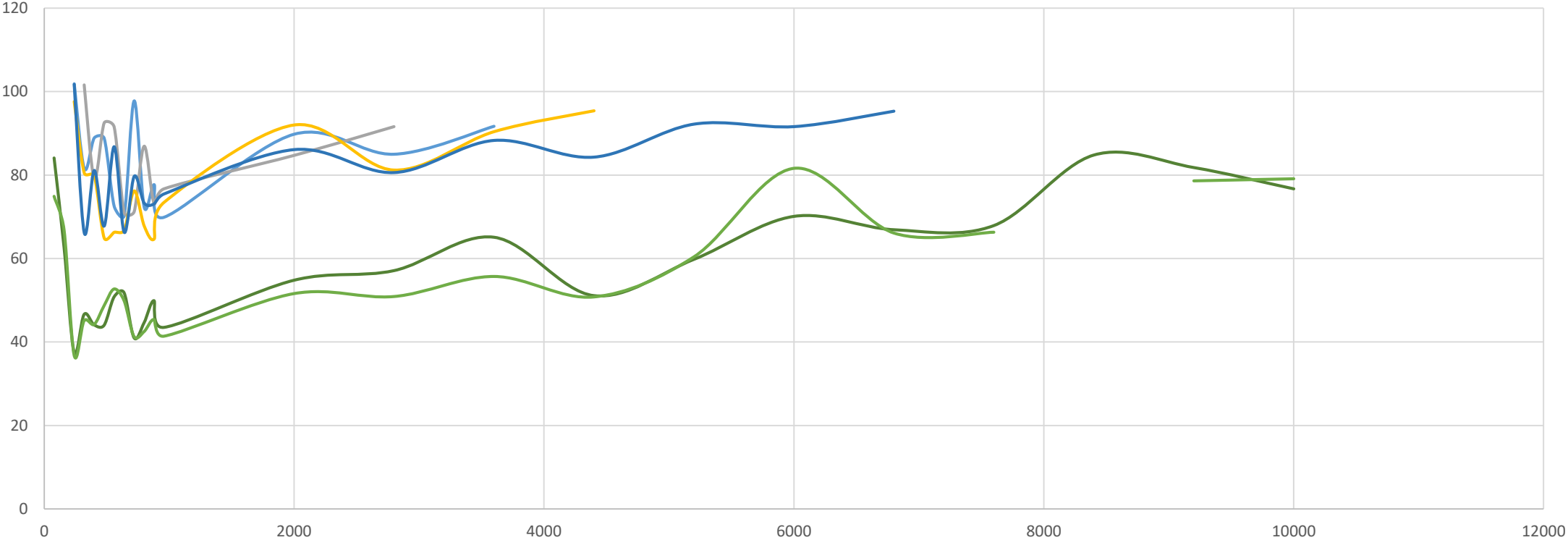
Carbon sample MR_V and copper sample, MR_V



The results of the measurements

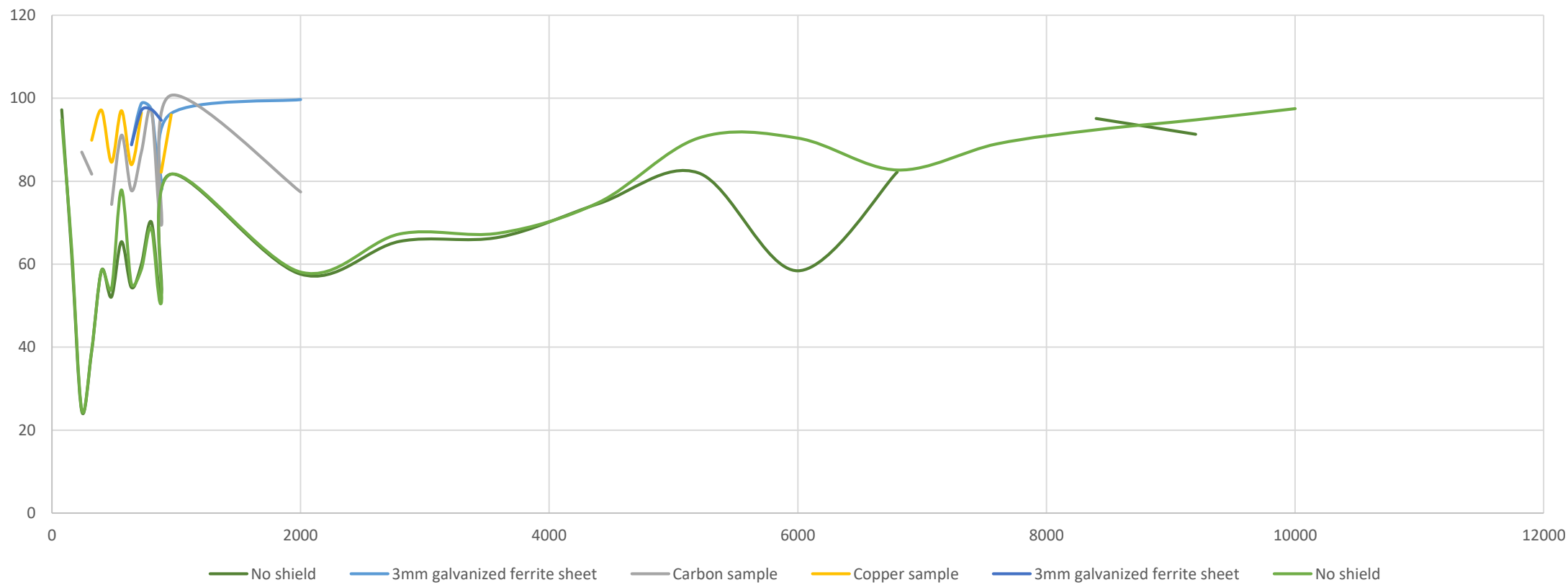


ER_H

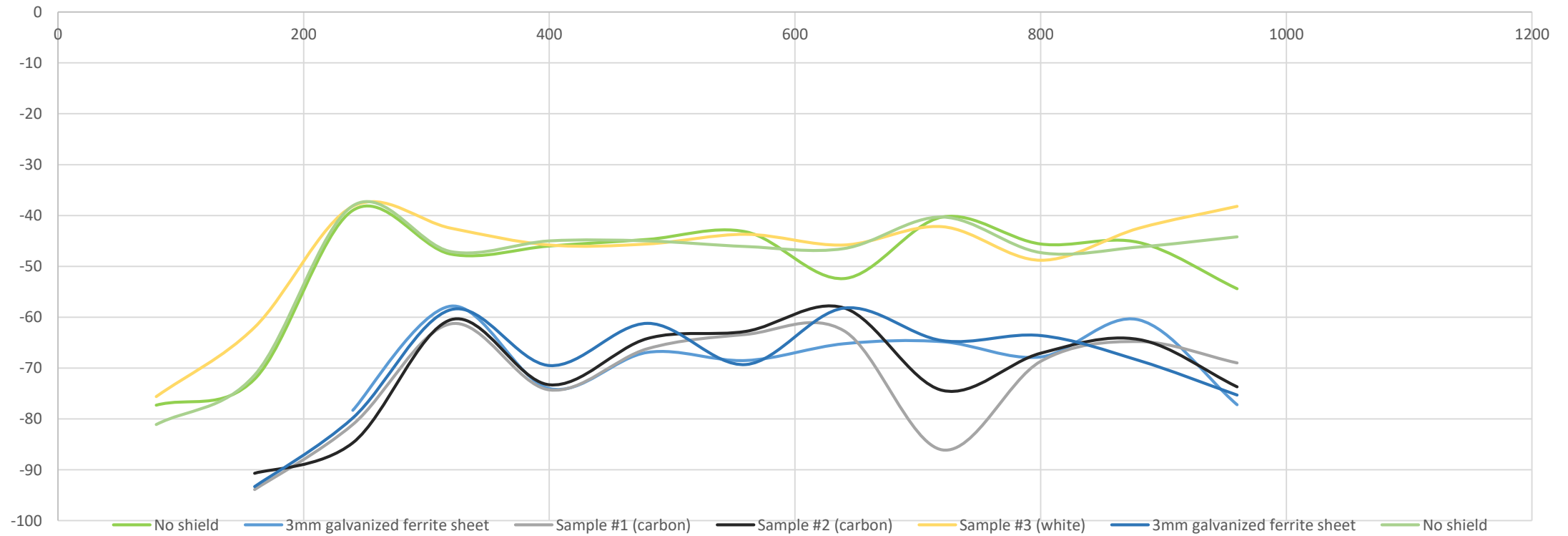


— No shield — 3mm galvanized ferrite sheet — Carbon sample — Copper sample — 3mm galvanized ferrite sheet — No shield

MR_V



ER_H



Conclusion

- the carbon fibre materials and the copper fibres are comparable with the 3 mm thickness ferrite sheet.
- Lightweight materials can be good reinforcing materials for a new lightweight Faraday cage
- Fibreglass is good reinforcing material for the composite material, but it is not good for electromagnetic shielding purposes

Publications

Security-Related Advanced Technologies in Critical Infrastructure
Protection Theoretical and Practical Approach - NATO Science for Peace
and Security Series C: Environmental Security

Subjects fulfilled

Semiconductor devices

- Dr. Horváth Zsolt József

Transmission electron microscopy for structural investigations of different materials

- Dr. Balázs Katalin

Future Plans

- Literature
- Designing new composite materials for different levels of shielding based on the literature study
- Testing the new composite materials
- Improvement of the new material depending on its properties
- Final testing and (publish)
- results conclusion
- Publications

thanks for your attention