

RECO2MAG

Grain boundaries engineered Nd-Fe-B permanent magnets



Duration of the project: 2022 – 2023

Total budget: 1,220,207.00 €

Project leader: Jozef Stefan Institut (JSI), Ljubljana, Slovenija

Co-location centre: EIT RawMaterials CLC East

Consortium:

Geological Survey of Slovenia, GeoZS, Slovenia

IVL Svenska Miljöinstitutet AB (IVL Swedish Environmental Research Institute), Sweden

Jozef Stefan Institut, Slovenia

Magneti Ljubljana d.d., Slovenia

University of Belgrade - Faculty of Mining & Geology (UNIBG-RGF), Serbia

University of Zagreb – Faculty of Mining, Geology and Petroleum Engineering (UNIZG-RG), Croatia

Valeo Powertrain Systems, France



Web page: <https://reco2mag.rgf.bg.ac.rs/>

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Project description:

RECO2MAG has a clear focus to use the latest research for optimisation of manufactured permanent magnet (PM) microstructures via novel grain boundary processing to produce resource efficient sintered NdFeB PMs with lowered Dy content and improved energy products to be applied in novel electromotors. LCA/LCC analysis Coupled with the latest geological information for critical raw materials will create an independent and efficient EU industry ecosystem.

Project objectives and scopes:

RECO2MAGs objective is to use the latest technological innovations for heightened raw material efficiency in the production of permanent magnets (PMs), coupled with the latest information on critical raw materials

resources in RIS countries, to create product chain organisations for a more independent and efficient EU PM industry ecosystem. Six specific objectives are foreseen:

1. To make the NdFeB PMs with reduced Dy and Nd content. Current contents are 9 wt % for high T and 1 wt. %, for low T PMs, we aim at <5 wt %, <1 wt. % of Dy respectively, via electrophoresis. (TRL 3-4) (JSI, Magneti)
2. To improve the current grades on NdFeB PMs. Current grades currently produce in Magneti Ljubljana are N 33-40. We aim at N>45-50, via lowering the grain size < 5 μm , less oxygen content <0.1 wt.% and better grain alignment > 98 % manufacturing. (TRL 3-4)(JSI, Magneti)
3. To supply the guidelines for the laboratory scale production of novel high-N PM production. (TRL 4-5) (Magneti, JSI)
4. To perform demonstration and assess performance of the newly developed magnets in e-motors. (TRL 4-5) (VALEO, Magneti)
5. To establish a network of REE key partners for onward development. (GEOZS, UNIZG-RGNF, UNIBG)
6. To assess the overall environmental and economical sustainability (LCA; LCC) of producing magnets with the current production vs. the novel production of NdFeB PMs, to assess circular economy performance of new magnets, and to provide recommendations for policy makers from the conclusions. (IVL, Magneti, GEOZS, UNIZG-RGNF, UNIBG, JSI)
7. To utilise new survey data to identify and assess REE resources within ESE region, and to integrate this data into long-term strategic planning for the EU's PM industry sector.

Abbreviations:

N – “neo”, Neodymium

PM - Permanent Magnet

REE – Rare Earth Elements

TRL - Technology Readiness Level

LCA - Life Cycle Assessment

LCC - Life Cycle Cost