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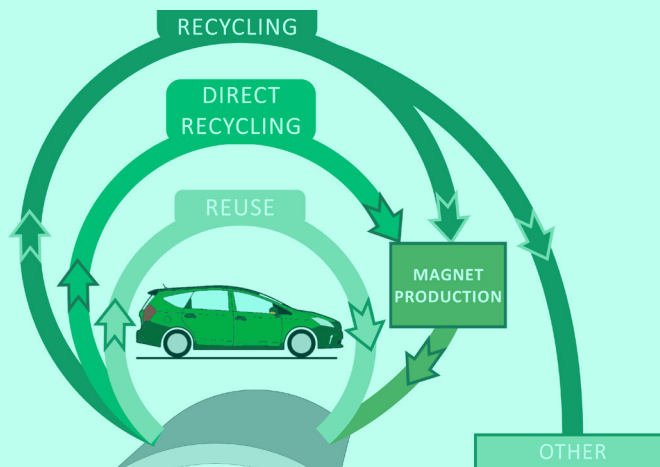


European Training Network for the Design and Recycling of Rare-Earth Permanent Magnet Motors and Generators in Hybrid and Full Electric Vehicles.



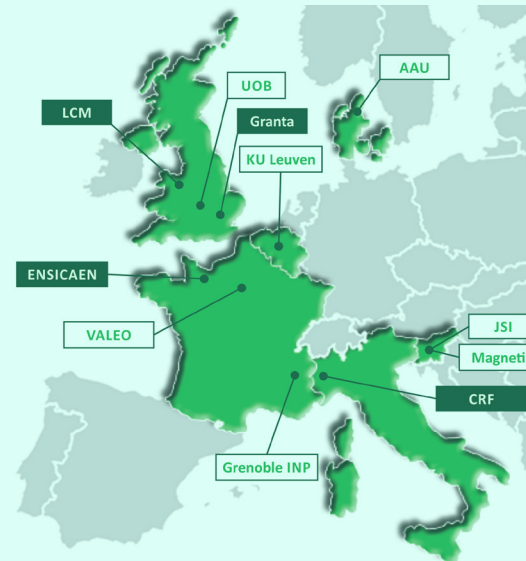
## Introducing DEMETER

The project focuses on the recovery of large (i.e. > 30 g) NdFeB and SmCo permanent magnets in the drive motor, the power-steering motor, the stop-start motor, and the regenerative braking and range extender generators in (H)EVs and in highly Advanced ICEVs. In DEMETER the first aim is to develop strategies based on Design-for-Reuse with new generations of motors/generators that incorporate standard sizes of magnets that can be easily removed for re-use in new (H)EVs (and Advanced ICEVs). The second option is direct recycling, in which case the magnets are treated as a raw material for the production of new magnets.



## DEMETER's specific objectives

- Develop innovative, eco-efficient direct and indirect recycling routes of NdFeB and SmCo magnets motors and generators from End-of-Life (H)EVs and Advanced ICEVs;
- Develop innovative processing techniques for production of high performance NdFeB and SmCo magnets;
- Design electric motors and generators for the next generation of (H)EVs and Advanced ICEVs to enable easy future reuse of NdFeB and SmCo magnets;
- Develop a complete, "(urban) mine-to-machine", lifecycle assessment (LCA) and lifecycle costing (LCC) methodology for REE permanent magnets to ensure the most environmentally-friendly and economical routes are applied for recycling.



## Meet DEMETER's 15 Researchers



ESR 1 [Anas Eldosouky]  
(Hydrogen Decrepitation Processing of SmCo magnets)  
Host: Magneti Ljubljana (Slovenia)  
Supervisor: Dr. Irena Skulj (Magneti),  
Prof. Tina Zuzek (Jozef Stefan Institute)



ESR 2 [Muhammad Awais]  
(Extraction of NdFeB magnets from EoL (H)EVs/Advanced ICEVs and conversion into master alloys)  
Host: University of Birmingham (UK)  
Supervisor: Dr. Allan Walton (UOB)



ESR 3 [Martina Orefice]  
(Recovery of metal values from SmCo and NdFeB magnets by ionometallurgical methods)  
Host: KU Leuven (Belgium)  
Supervisor: Prof. Koen Binnemans (KU Leuven)



ESR 4 [Simona Sobekova] (Sm/Co and Nd/Dy/Fe separation by solvent extraction with ionic liquids)  
Host: KU Leuven (Belgium)  
Supervisor: Prof. Koen Binnemans (KU Leuven)



ESR 5 [N/A]  
(Electrodeposition of SmCo alloys from ionic liquids)  
Host: KU Leuven (Belgium)  
Supervisor: Prof. Jan Fransaer (KU Leuven)



ESR 6 [Junhua Xu] (Development of novel hard magnetic Nd-Fe12Nx-based magnets by electrodeposition)  
Host: Jozef Stefan Institute (Slovenia)  
Supervisor: Prof. Tina Zuzek (Jozef Stefan Institute),  
Prof. Jan Fransaer (KU Leuven)



ESR 7 [Awais Ikram]  
(Metal bonded magnets from Hydrogen Decrepitated materials using spark plasma sintering)  
Host: Jozef Stefan Institute (Slovenia)  
Supervisor: Prof. Tina Zuzek (Jozef Stefan Institute)



ESR 8 [Arnab Chakraborty]  
(Exchange coupled Sm-Co magnets with high remanence)  
Host: Magneti Ljubljana (Slovenia)  
Supervisor: Dr. Irena Skulj (Magneti),  
Prof. Tina Zuzek (Jozef Stefan Institute)



ESR 9 [Amit Kumar Jha] (Design of Halbach permanent magnet outer rotor machine for electro-mobility)  
Host: Grenoble INP (France)  
Supervisor: Dr. Afef Kedous-Lebouc (Grenoble INP),  
Prof. Peter Rasmussen (Aalborg University)



ESR 10 [Adolfo Garcia] (Recyclable electrical machine designs with 3D flux and non-traditional materials)  
Host: Aalborg University (Denmark)  
Supervisor: Prof. Peter Rasmussen (Aalborg University),  
Dr. Afef Kedous-Lebouc (Grenoble INP)



ESR 11 [Pranshu Upadhayay] (Electrical machine designs based on 3D flux paths for new generation HEVs)  
Host: Valeo Electrical Systems (France)  
Supervisor: Dr. Jean-Claude Mipo (Valeo),  
Dr. Afef Kedous-Lebouc (Grenoble INP)



ESR 12 [Ziwei Li]  
(Electrical radial flux machine design for new generation (H)EVs)  
Host: Valeo Electrical Systems (France)  
Supervisor: Dr. Jérôme Legranger (Valeo), Dr. Afef Kedous-Lebouc (Grenoble INP), Prof. Peter Rasmussen (Aalborg University)



ESR 13 [Muhammad Farhan Mehmood] (Nanoscale characterisation and in-situ dynamic electrochemical TEM studies of recycled magnets)  
Host: Jozef Stefan Institute (Slovenia)  
Supervisor: Prof. Saso Sturm (Jozef Stefan Institute)



ESR 14 [Fernando Coelho] (Characterisation and modelling of Automotive Scrap Residue (ASR) feeds to improve recycling efficiency)  
Host: University of Birmingham (UK)  
Supervisor: Prof. Neil Rowson (UOB), Prof. Karel Van Acker (KU Leuven)



ESR 15 [Gwendolyn Bailey] (Life cycle assessment of new recycling and reuse routes for REE magnet machines in (H)EVs)  
Host: KU Leuven (Belgium)  
Supervisor: Prof. Karel Van Acker (KU Leuven), Prof. Neil Rowson (UOB)

## BENEFICIARIES



## PARTNER ORGANISATIONS

