



Open Post Doc Position: Recycling and reprocessing of rare-earth—transition metal-based permanent magnets

The rare earth-transition metal (RE-TM) permanent magnets (PMs) like Sm-Co and Nd-Fe-B incorporate a significant amount of the of rare-earth elements (REEs) and represent an essential secondary REEs resource. To develop environmentally-friendly and cost-effective approaches for RE-TM PMs magnets recycling is now categorised as a “key enabling technology” with the prospect of positioning REEs within the circular economy.

Sintered Nd-Fe-B magnets consist of REE-rich grain boundaries, representing about 10–12% of the magnet, and the $\text{Nd}_2\text{Fe}_{14}\text{B}$ grains, which is practically oxygen-free, accounting for 85–87% of the magnet and can be directly extracted. The candidate is going to explore the possibilities to recycle the end-of-life Nd-Fe-B PMs and convert them to novel types of permanent magnet that will complete the REEs recycling loop. The overall objective of this project is to physically and electrochemically recycle Nd-Fe-B PMs down to grain size and to synthesize novel RE-TMs magnets, out of recycled feedstocks using grain boundary modifiers, conventional powder metallurgy, electrochemical synthesis techniques and novel 3D printing technologies.

The candidate will have the opportunity to use advanced synthesis and materials characterisation techniques that will enable the optimisation of process parameters towards the final objective.

Minimum requirements for application

- MSc in either physics, material science, chemistry or chemical engineering
- PhD in either physics, material science, chemistry or chemical engineering or physical chemistry like electrochemistry. Candidates with PhDs orientated on permanent magnets processing and characterisation are in advantage.

Appreciated skills and expertise

- The knowledge sought is from the electrochemistry of materials, material science, physics etc. Candidates previously working with permanent magnets are in advantage. Here the basic understanding of the permanent magnetism basics is sought.
- Knowledge of English is a requirement.
- **A CV with all the information on the obtained degrees and bibliography is required along with a paragraph on the ideas of how to reprocess the recycled Nd-Fe-B which will be considered as an extra effort.**

Contact specification:

1 year contract is offered with the possibility of extension. Starting date, Autumn – Winter 2019/2020.

For more info, contact:

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