

Advanced Green Technologies

- Research, development, and innovation in this field play a major role in improving the quality of life.
- They enable technological progress across all sectors of society—in the domestic living environment as well as in industry, transport, food, healthcare, and information processing.
- In the field of new materials, priority is given to the introduction of technologies free of toxic heavy metals and rare earths, as well as integration via IoT interfaces and sensor systems.

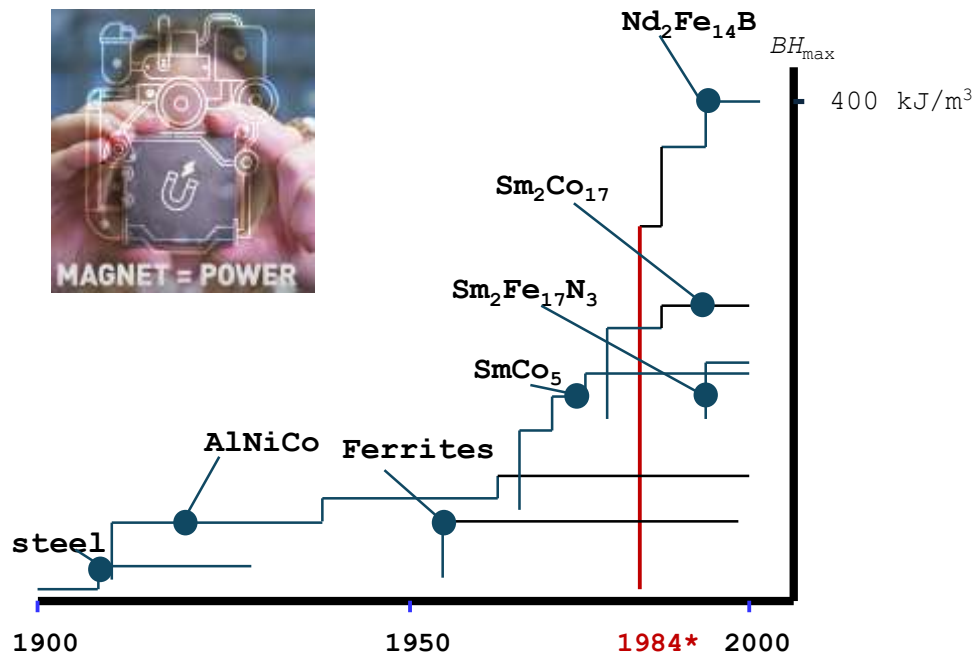
Magnetic materials

- We address challenges closely linked to the goals of the 'European Green Deal' and the 'Critical Raw Materials Act'.
- We contribute to climate neutrality by developing resource-efficient and eco-friendly e-mobility.
- At the same time, we promote a better circular economy in material use through recycling, which leads to a reduced EU dependence on the import of critical raw materials.
- To this end, we design solutions regarding the design, production, and use of critical raw materials and permanent magnets with enhanced magnetic properties and efficient use of material resources.
- Advanced synthesis processes that incorporate material recycling and lower energy consumption are currently in the lead.

From Critical Raw Materials to Green Technologies: Circular Economy of REE-Based Permanent Magnets

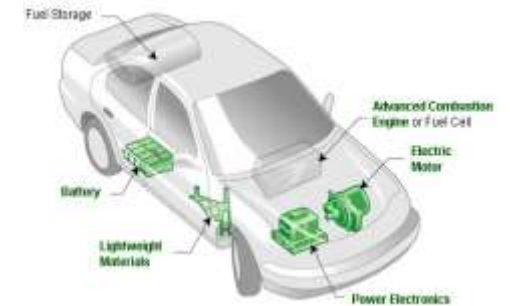
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Permanent magnets: perspectives and challenges



*Masato Sagawa, Japan, metallurgical process, John J. Croat, General Motors, U.S., melt-spinning

- A permanent magnet is an energy storage device. The maximum energy product (BH_{max}) determines how much energy it can store.
- Nd-Fe-B permanent magnets exhibit the highest BH_{max} .
- They are indispensable in e-motors in e-mobility and green energy applications
- The EU considers them to be key in the European Green Deal, the Zero Industry Act, the New Circular Economy Act, and the Critical Raw Materials Act.

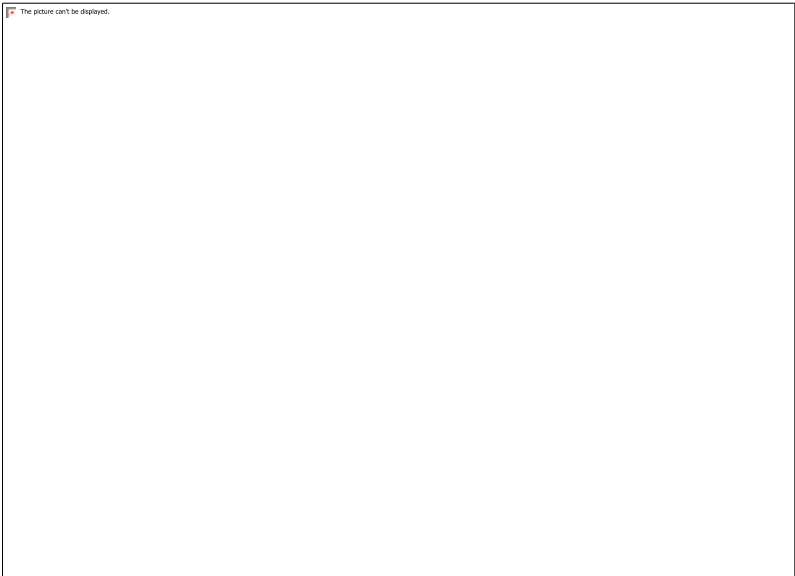
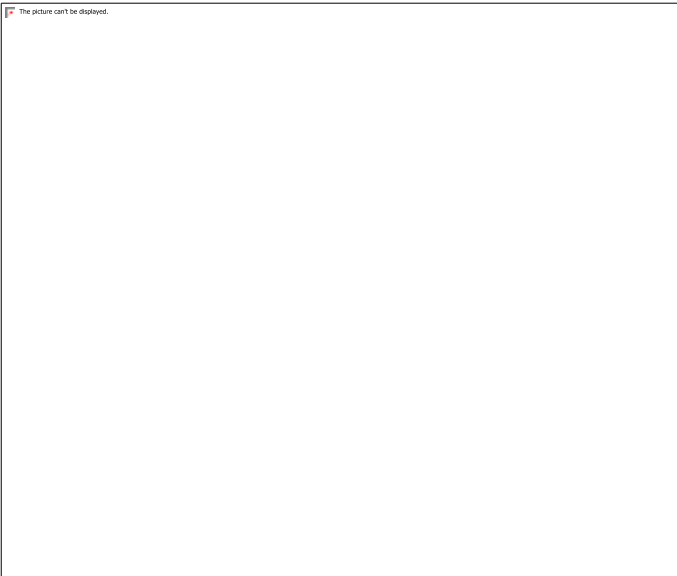


Magnet power↑ magnet size↓ motor size↓ battery
size↓ milage↑

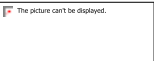


Knowledge transfer TRLs 3-6

- The first research pilot line for the production of NdFeB magnets is being set up, which will facilitate the transition of the new material from the laboratory level to industry.
- The laboratory will contribute significantly to a better transfer of technology from theory to practice, or from the laboratory to industry, and will represent an important link in the instrument of the distributed National Demonstration Center for Smart Factories (NDC PT)."

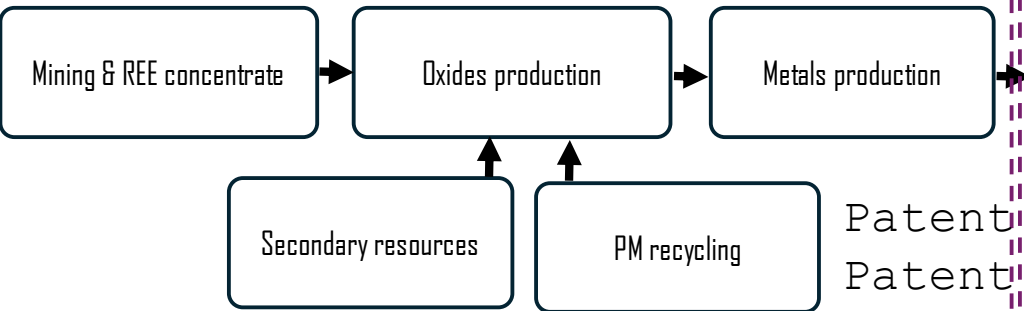


Open innovation test beds

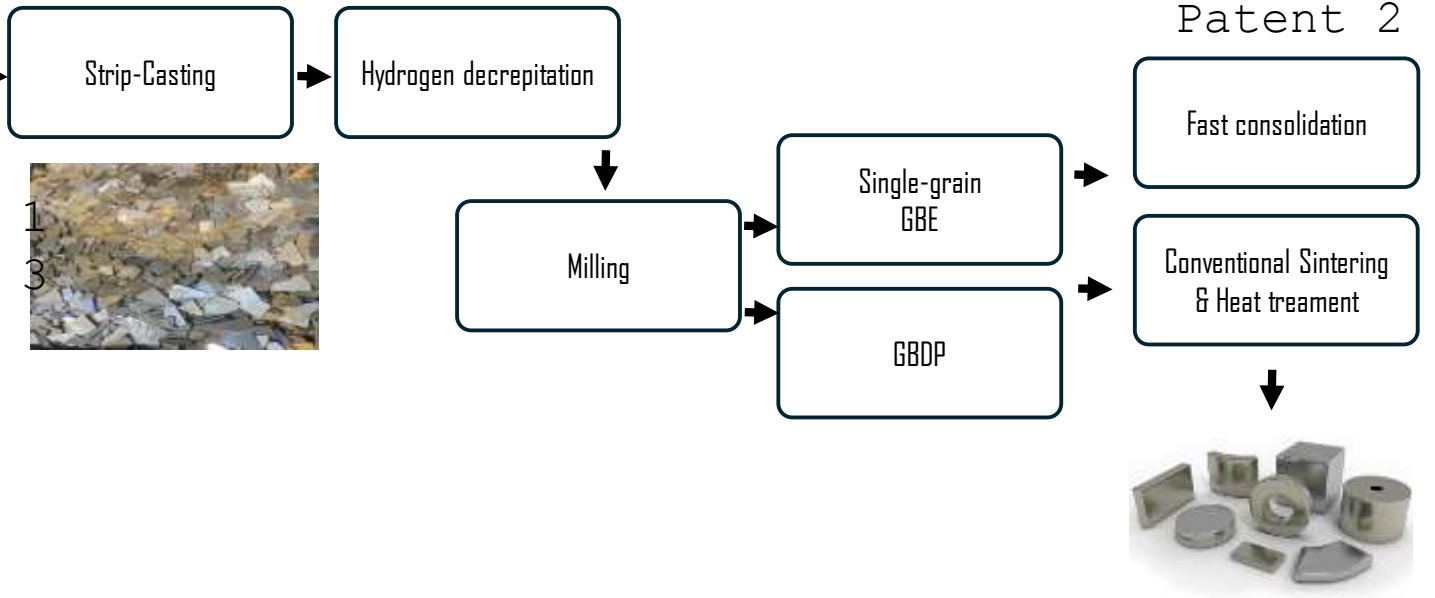


Knowledge transfer TRLs from 1-3 to 3-6, Pilot - beta prototype

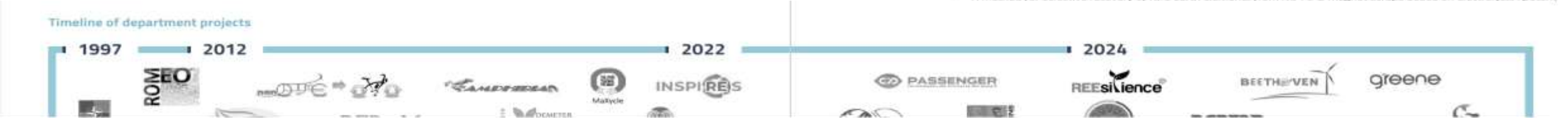
Critical Raw Materials Extraction



Advanced Magnet Technologies



- A method for recovery of Nd, Fe, B grains from bulk sintered Nd-Fe-B magnets and/or magnet scraps by electrochemical etching: EP 18208508.4, Munich: European Patent Office, 2021 (14 str).
- A method for rapid sintering of rare-earth magnet powders based on thermal radiation and/or convection: EP24169567, 2024-04-10, München: European Patent Office, 2024.
- A method for selective recovery of rare earth elements from Nd-Fe-B magnet scraps based on electrolysis: patent



Critical Raw Materials Laboratory



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