HARMONY

Recycling rare earth elements from end-of-life NdFeB permanent magnets **for industrial use**

HARMONY developed complementary direct and indirect routes for recycling end-of-life NdFeB magnets. The project connects collection and dismantling with powder production, rare-earth recovery and magnet manufacturing. Bonded and sintered magnets were produced and characterised for testing in three industrial applications.

Magnet collection & dismantling

Powder production

Magnet production

Pilot Technologies

TWO ROUTE FAMILIES

Direct recycling: Reprocesses the magnet alloy directly into powder for manufacturing recycled magnets.

Indirect recycling: Separates and recovers rare earth elements for renewed alloy and magnet production.

Collection & dismantling optimisation

Pyrometallurgy

Selective leaching

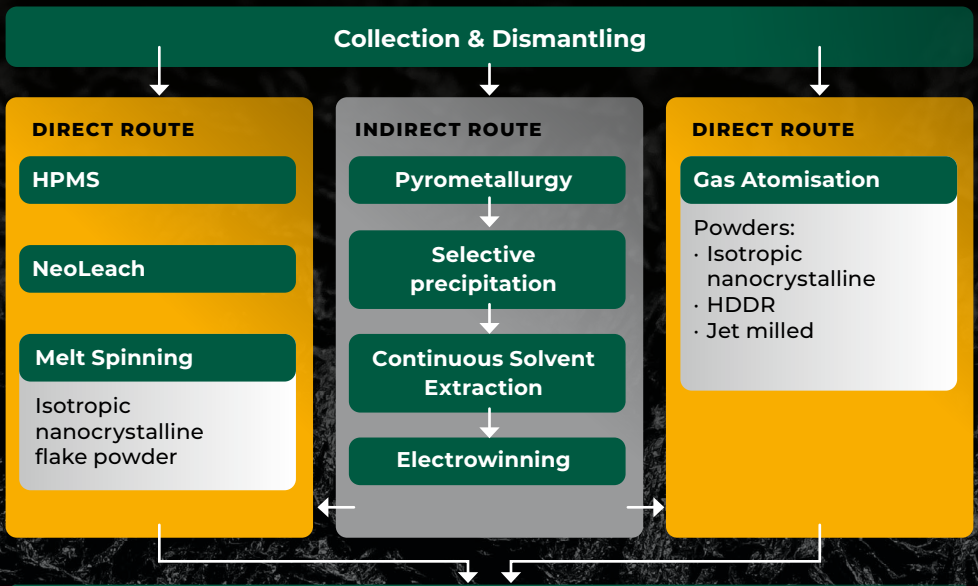
Solvent extraction

Electrowinning

Gas atomisation

Melt spinning

NeoLeach



Applications

Hydraulic pump motor

Recycled melt-spun powder was injection moulded into bonded magnets, integrated into a hydraulic pump motor and tested for appliance use.

Automotive axial-flux motor

Recycled HPMS powder was processed into sintered magnets, whose properties informed the axial-flux motor design, followed by integration and testing in an automotive demonstrator.

Wind turbine generator

Recycled material was processed into sintered magnets, tailored to generator requirements, then integrated into a wind turbine generator and evaluated through prototype testing.

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Co-funded by the European Union