

## Reducing the Heavy Rare Earth Consumption in NdFeB Magnets via the 2-Powder Method

The 2-powder method (2PM) for manufacturing sintered NdFeB magnets, patented by TU Darmstadt and further developed by Fraunhofer IWKS, offers the possibility of significantly reducing the criticality of rare earth-based magnets. Heavy rare earth elements (HREs) such as Dy or Tb are used in green technologies like traction motors of electric vehicles to ensure sufficient temperature resistance of the magnets. In powder metallurgical production using the 2PM, a specific microstructure is set, whereby the HREs are only located in the outer areas of the hard magnetic grains. Compared to previous resource-optimized manufacturing processes like the conventional used grain boundary diffusion process (GBDP), the 2PM can also be used to process larger magnets (> 10 mm).

In this study, different jet mill powders, all in the single micron range, were mixed, and the influence of particle size differences on the magnetic properties was analyzed. Based on these results, huge 350 g magnets with dimensions of approximately 45 mm in height and 40 mm in diameter were prepared. Furthermore, the microstructure was examined using high-resolution analysis methods such as SEM, and atomic probe tomography. In addition, the 2PM was compared with conventional manufacturing methods using life-cycle-assessment.

### Professional Status of the Speaker

Postdoc

### Interest in submitting a paper in a special issue of

No interest

### Invitation letter for visa

No

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