

## Processing and Characterisation of Bulk Melt-Textured YBCO Monoliths and Function Elements

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The unique magnetic properties of bulk melt-textured (RE)BCO-materials can be used in many new applications. At the IPHT Jena we investigate the whole technology from precursor optimisation up to the passivated function element.

We developed a batch process where several monoliths of Yttrium-Barium-Copper-Oxide are processed in box furnaces in air under nearly isothermal conditions. Self made SmBCO seeds lead to single domain material. The application defines the optimum shape of a monolith. Our process allows to texture differently shaped material. A batch consists of 16 monoliths with a size of 38mm\*38mm\*17mm, or 8 multi-seeded blocks (75\*38\*17), or 16 cylinders with a diameter of 45 mm. The batch process can be scaled up for an industrial production.

The quality of each monolith is checked trapped field measurements. After field cooling at 77K in a dc-magnetic field of >2T a hall probe is scanned 0.5 mm above the superconductors surface. In a batch of standard material a mean trapped field of 1.2 T at this distance is achieved. Investigations of the microstructure showed inhomogeneities in the material related to the precursor and the growth process. A single domain monolith may consist of a material with different quality.

After characterisation the monoliths are machined for function elements. For reluctance motors working at 77K plates are needed. The motors were tested up to an output power of more than 200kW at 3000 rpm. Standard batch processed material will be used in the magnetic bearing of the German fly-wheel project "DYNASTORE". Here a system with a stored energy of 10 kWh and an output power > 1MW will be constructed. Also we equipped a man-load Maglev model, that was successfully demonstrated in Moscow. Rings cut of our material will be tested for inductive fault current limiters.

### *Acknowledgement*

Our work is supported by the German BMBF, BMWA, and the EU.