Focus Area 3

Improving Reuse & Recycling

Lead: Eric Peterson, INL
Deputy: Ed Jones, LLNL

Source Preparation (Separation & Concentration)

B. Mishra, CSM

- Recovery and Reuse of Rare Earth Metals from Phosphor Dusts, *B. Mishra*, *CSM* (3.1.1)
- Beneficiation of Photovoltaic (and other) Functional Coatings, invention, *P. Taylor*, *CSM* (3.1.4)
- Transforming Reuse and Recycling of Rare Earth Magnets, invention, *T. McIntyre*, *ORNL* (3.1.5)
- Thermal Barrier Coat Revert and Future Opportunities, *S. Hung*, *GE* (3.1.6)

Transformative Extraction & Materials Production

R. Fox, INL

- Supercritical Fluid Beneficiation of Waste Streams, *R. Fox*, *INL* (3.2.1)
- Membrane Solvent Extraction for Rare Earth Separations, invention, *R. Bhave*, *ORNL* (3.2.2)
- Bioleaching for Recovery of Recycled REE, *D. Reed*, *INL* (3.2.5)
- Recovery of Critical Materials from Consumer Devices, invention, *T. Lister*, *INL* (3.2.6)

CSM: Colorado School of Mines GE: General Electric INL: Idaho National Laboratory
LLNL: Lawrence Livermore National Laboratory ORNL: Oak Ridge National Laboratory

CMI invention disclosures

Of 20 invention records posted online by January 2015, 10 relate to FA3:

- Recovery of neodymium from neodymium iron boride magnets
- Membrane solvent extraction for rare earth separations
- Recovery of Dy-enriched Fe alloy from magnet scrap alloy via selective separation of rare earth elements
- Recycling and conversion of samarium cobalt magnet waste into useful magnet
- High throughput cost effective rare earth magnets recycling system
- Recycle of Fe Nd B machine swarf and magnets
- Directly printing rare earth bonded magnets
- Procedure for concentrating rare-earth elements in neodymium iron boron-based permanent magnets for efficient recycling/recovery
- Enhancing consumer product recycling via rapid fastener eradication
- Automated printed circuit board disassembly by rapid heating