RARE EARTH AND CRITICAL MATERIALS
DECEMBER 6, 2010 IN ARLINGTON, VA

Breakout Sessions:
Supply
SUPPLY / MATERIALS PROCESSING:
BACKGROUND

- Rare Earth (RE) availability currently limited by processing challenges from known deposits, based on acid-alkaline chemical processes and solvent extraction.

- Commercial RE processing chemicals and quantities have environmental and cost considerations.

- Alternative physical, chemical, or biological RE processes are of high interest; high-selectivity separation technologies are needed.

- New technology pathways to cost effective separation and concentration of neodymium and dysprosium are of high interest.
SUPPLY / MATERIALS PROCESSING: QUESTIONS

- Are there completely new process pathways which may be used, and subsequently scaled, for the processing of rare earths?

- Can we leverage the knowledge base from the actinide materials processes realm to the lanthanide / rare-earth materials processes?

- Can geobacters with strong affinity for specific rare-earth elements be identified and developed in potentially industrially relevant processes?
Strawman Targets for Material Supply

Neodymium, Dysprosium, Yttrium and Terbium Extraction from Supply, at

>98% purity

less than $2/kg cost

all environmental cost included

subsequently scale-able to >50,000 kg/yr
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- Liquid-Liquid extraction – Low temperature
- Molten Salt Electrolysis – High temperature
- Bioengineering / Biomimetic / Geobactors
ISSUES

- Simplifying the flow sheet
- Environmental Impacts / Health effects
- Recycling / reuse - process compatibility
- Water / reagent recovery / recycling
- Lanthanide / actinide comparisons
- Education / workforce
NEW TOOLS / GAME CHANGERS / DISRUPTIVE TECHNOLOGIES

- Computation modeling – rational ligand design
- Nanoscience
- Biomimetic / Bioengineering
- Ionic Liquids