

PhD proposal and progress review, 11-4-2015

CN

AR

NW

MJS

Alex Horkov

AD

Objectives

- (1) Determine REE abundance and trends in natural waters
- (2) Develop liquid-liquid extraction technique for separation of REE from hypersaline brines
- (3) Study the effects of ligand geometry and partitioning

from work on (1):

most gm are heavy-REE enriched

Objective 3 - need to generalize, to clarify that focus is on extraction from brines for recovery.

DD - would be helpful to show a graph w/ dg. specification of REE as a function of μ .

MJS - expt design for the three REEs
 - need to show expt design matrix

AD - why the particular REEs?

MJS - joint distrib of REEs in rest markets
 - need to think about questions that governed the expt design
 eg, can models for ads be applied to the separate REEs?

AD - use distrib of REEs to justify selections of specific REEs for study.

CN \rightarrow at low concs, intersections likely to be minimal

MJS - but try some higher concs

Ale Hakala

- change obj to be more broad
- opportunity to try natural brine? within range of expt design.

CN - depends on ability to get a brine from INL or other source

Ale Hakala

- Kelly Rose - NETL Albany - has brine from a geothermal power plant
- think that Berkeley team has done an analysis
- ~~the~~ what about competing org acid anions? geothermal fluids probably won't have much organics
- CN - surf ligands probably will out-compete any org acid ligands present
- biggest issues for organics in water will likely be fouling of the column.

- AA - would redox potential affect the PEE or the ligands?

CN - most PEEs are not redox active

DD → need to present specification, somehow

NW → thesis needs a bridge between first two chapters, and the ads chapter

→ perhaps a chapter 3 w/ intro ~~PEE~~ chemistry, Thermodynamics, kinetics

CN - most ~~PEEs~~ form carbonate complexes, at mid- to high pH

→ Cl^- complexation at low pH

→ weak hydrolysis reactions