**Demonstration of Hard-Soft Acid-Base Theory:**

**An Ion-Exchanger for Recovery of Rare Earth Metals**

*Pre-Literature Discussion Activity*

Layered A2Sn3S7·1.25H2O (A = Organic Cation) as Efficient Ion-Exchanger for Rare Earth Element Recovery

By

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***Mission:*** *To be prepared for discussion of HSAB theory and how it relates to recovery of rare-earth metals*

***Instructions:*** *For the upcoming in-class literature discussion please open the article referenced above and read the Introduction (first 4 paragraphs) carefully. Then, inspect all the figures to get an idea of the data types used by the researchers.*

*Complete questions 1-7 before the beginning of class, post your responses to the assigned Dropbox on Folio. We will work on understanding the paper at a deeper level during our class meeting and discussion.*

**Pre-Class Reading Questions:**

1. What benefits to society do the authors describe if efficient separations of rare earth elements (REE) can be achieved?
2. What are the major challenges associated with REE separation?
3. What do the authors say are ideal characteristics of an efficient REE adsorbent?

1. What are some “novel” adsorbents that are listed and what are their limitations?
2. What is the composition of the layered stannate (FJSM-SnS) presented in this paper? What do you think the factional subscripts mean?
3. As you read identify at least three words or terms you do not know. List them and look up a definition you think the authors are using and write it in your own words.
4. Read the first 4 paragraphs. Write one or two sentences summarizes the *major accomplishments* reported in the article. You may want to read the conclusion paragraph for this also. Make sure to include the relevance of the efficient elution of REE from FJSM-SnS with KCl solution.