

G. Peters' comments and questions on poster:

**“Experimental and Thermodynamic Modeling of Multicomponent Ion Exchange of Alkali and Alkaline-Earth Metals in Clinoptilolite”**

<b>Section</b>	<b>Comments/Questions</b>
<b>Background</b>	1. Please define what is meant by “favorable” with respect to ion-exchange selectivity
	2. The introduced themes of ion selectivity and chemical evolution of zeolite, which are significant to the YM program, are not developed further in the poster.
<b>Objectives</b>	3. Are these calculations of thermodynamic properties and mole fractions/activities valid given the likely presence of other cations (e.g., Mg <sup>2+</sup> ) in the natural system?
<b>Methods and Approach</b>	4. Cesium is mentioned as a cation of interest but does not appear anywhere in the analyses
<b>Non-ideal behavior</b>	5. In first parenthetic term of equation, subscript k seems like it should be subscript i in variable $\Lambda_{kj}$ ; otherwise, please define.
<b>Figure 1</b>	6. Please note that the alluvium is from the Yucca Mountain region, not YM itself; may also be useful to point out that the alluvium unit is one through which groundwater flows and that would serve as an adsorptive medium in the event of a release from the repository.
<b>Figure 2</b>	7. Li <sup>2+</sup> is included in figure but note specified as a ‘cation of interest’ in earlier sections; similarly, is there any reason not to perform this analysis on Ca <sup>2+</sup> and Sr <sup>2+</sup> ?
	8. It’s not clear what the diagonal lines in the graph represent; can these be clarified?
<b>Figure 3</b>	9. See comment 7 with respect to Li.
<b>Figure 4 (both)</b>	10. There are two Figure 4s on the poster. Second seems like it should be Figure 5, based on fourth bullet of Results section.
	11. Please define what E and E-bar represent
<b>Figure 4 (first)</b>	12. Please explain the what the red circles and blue squares represent.
	13. Why do some data have error bars and others do not?
<b>Figure 4 (second)</b>	14. Suggest using either “calculated” and “predicted” consistently in second and third sentences of caption; “predicted” might be the more accurate choice.
<b>General questions</b>	15. In a dynamic, flowing groundwater system, would you expect to achieve equilibrium or are there kinetic limitations?
<b>(i.e., not specific to material presented)</b>	16. Do you assume that there is only one type of exchange site on the medium? If so, is this realistic given the characteristics of alluvium?
	17. Do you need to worry about or consider incomplete dissociation, closed- vs. open systems with respect to Ca, Na, K, or ion-pairs?
	18. Does the non-exchanging anion affect these analyses?
	19. Any reasons not to include other methods (e.g., Vo & Shallcross, 2003; Melis et al. 1995).

