

## APPENDIX 1. EXPERIMENTAL DETAILS

Reactants (clay, methanol, water) were sealed in sterilized Au capsules. Duplicate capsules were loaded for reaction with 200 mg of dried clay (<0.2  $\mu\text{m}$  fraction) and 200  $\mu\text{l}$  of 10.4 M aqueous methanol. Minerals (SWy-1, IMt-1) were from the Clay Minerals Repository, Purdue, Indiana. The saponite was described in Eberl et al. (1982). Capsules were pressurized in a cold-seal vessel with distilled  $\text{H}_2\text{O}$  as pressurizing medium (Williams et al., 2001). The vessel was heated in a furnace with a  $\pm 5^\circ\text{C}$  variance along the length of the capsules. After reaction, capsule weight verified that no mass was gained or lost.

Gases were collected from the headspace of each capsule by puncturing in vacuum. Organics were extracted from the clay using dichloromethane. Organic analyses were performed using Varian CP-3800 GC with Supelco SPB-1000 capillary column, Shimadzu GC-17A/MS-QP5000, and Agilent 6890/5973 GC-MS each with J&W Scientific DB-5MS fused silica capillary column (30 m x 0.25 mm).

### References

- Eberl, D.D., Jones, B.F., Khoury, H.H., 1982, Mixed-layered kerolite/stevensite from the Amargosa desert, Nevada. *Clays and Clay Minerals*, v.30, p. 321-326.
- Williams, L. B., Hervig, R. L., Holloway, J. R., and Hutcheon, I., 2001, Boron isotope geochemistry during diagenesis: Part 1. Experimental determination of fractionation during illitization of smectite. *Geochimica Cosmochimica Acta*, v. 65, p. 1769-1782.