

REVISION OF "EXPERIMENTAL CONDENSATION OF CRYSTALLINE OLIVINE AND PYROXENE": L. Grossman<sup>1</sup>, A. Hashimoto<sup>1</sup>, and E. A. King<sup>2</sup>. <sup>1</sup>Department of the Geophysical Sciences, University of Chicago, Chicago, IL 60637. <sup>2</sup>Department of Geosciences, University of Houston, Houston, TX 77004.

In (1), we claimed to have found extremely fine-grained, crystalline olivine and pyroxene among the condensation products of the vapor emitted during solar furnace volatilization of a sample of the Murchison meteorite. We thus concluded that there are some conditions under which crystalline, stoichiometric silicates can condense from a vapor, even during rapid cooling, despite results to the contrary from other laboratories (e.g.2).

Phase identification in (1) was based on the presence of some of the strongest lines of olivine and pyroxene in X-ray diffraction patterns and on the atomic proportions derived from energy dispersive analyses with very low analytical sums of very porous aggregates of the material. Further work since our abstract (1) was submitted, however, revealed the probable presence of a phyllosilicate similar to the septechlorite mineral, cronstedtite. This phase has an X-ray pattern that provides a better match to the observed one than that of olivine, also has an (Mg + Fe)/Si ratio of two but characteristically contains large amounts of water and tetrahedral Fe<sup>3+</sup>.

We cannot rule out the possibility that this phase condensed under the conditions of the experiment. If, instead, the original condensates were composed of extremely fine-grained ( $\leq 0.1 \mu\text{m}$ ), iron-rich olivine or amorphous, Fe-, Mg-, Si-bearing material, it is quite conceivable that they would have reacted later with atmospheric water vapor to produce such a phyllosilicate, as both of these starting materials would have been very reactive. Because we cannot rule out the possibility of an amorphous starting material, we can no longer claim with certainty to have produced a crystalline silicate condensate.

Nevertheless, the reader is referred to the work of Hashimoto (3) for clear evidence that crystalline silicates can condense from a rapidly cooled vapor. In that work, silicate vapor was produced during laser heating of a target of diopside composition in an argon atmosphere. Condensate formed within seconds and, when examined shortly after the experiment, was found to contain 0.1  $\mu\text{m}$  diopside crystals. Finally, we reiterate our caution (1) that difficulties encountered in condensing crystalline silicates during experiments of short duration should not be used as evidence against their formation during the much longer cooling and condensation time-scale envisioned for the solar nebula.

REFERENCES: 1. Grossman, L., Hashimoto, A. and King, E.A. (1985) LPS XVI, 304-305. 2. Nuth, J.A. and Donn, B. (1982) J. Chem. Phys. 77, 2639-2646. 3. Hashimoto, A. (1976) B. Sc. Thesis, Nagoya University, Japan.