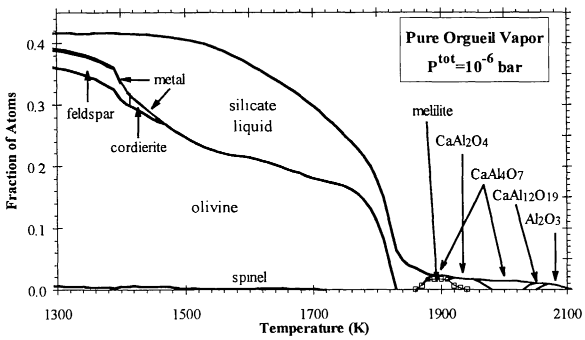

Fig. 1.

very small amount of Ni-rich (>70 mol% at $-8 < \log(P^{tot}) < -4$) metal alloy appears at 1450 K. Cr-rich spinel coexists with olivine over most of its stability range.

Compared with condensation from a vapor of solar composition, pure C1 chondrite vapor is a very oxidized system. In oxygen fugacities *versus*. T space, for $-8 < \log(P^{tot}) < -4$, condensation of C1 vapor begins near the iron-wüstite buffer, and rises above it with cooling. A vapor of solar composition at $P^{tot} = 10^{-5}$ bar follows a trajectory some 3 log units below iron-wüstite.

Conclusions: If chondrules were produced by splashing in the collision of undifferentiated molten planetesimals, then their chemistry should reflect some degree of equilibration with the vapor which should have been an accessory to the collision process. Calculations of vapor/liquid/solid equilibria in chondritic systems yield vapor so oxidizing that Fe enters abundant silicate phases, and trace metal alloy is Ni-rich. Some modification of planetesimal collision chemistry must be invoked for the splashing hypothesis to fit the facts: chondrule metal contains less than 15 mol% Ni, and chondrule glass and olivine are not so rich in FeO.

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CONDENSATION FROM THE PLUME OF AN OBLIQUE CHICXULUB IMPACT. D. S. Ebel[1,3] and L. Grossman[1,2], [1]Dept. Geophys. Sci., 5734 S. Ellis Ave., and [2]Enrico Fermi Inst., U. Chicago, Chicago IL 60637, USA, [3]present address: Dept. Earth Planet. Sci., Amer. Mus. Nat. Hist., New York NY 10024, USA (debel@amnh.org).

Introduction: In 1999 we calculated the production of spinel-bearing silicate liquid droplets from the condensing fireball produced in the Chicxulub Cretaceous/Tertiary impact [1], based on predicted plume compositions for 4 vertical impacts [2]. Recent calculations for oblique impacts [3], following only the first 5 post-impact seconds, predict the contributions of impactor [4], continental crust, and sediments [5] to the initial vapor plume.

Technique: Condensation calculations were performed as in [1,6,7], with elements H, C, N, O, Na, Mg, Al, Si, P, S, K, Ca, Ti, Cr, Mn, Fe, Co, and Ni, and a spinel model for $(Mg,Fe^{2+})(Fe^{3+},Ti,Cr,Al)$, so we do not address the mean ~3 wt% Ni of the K/T spinels [8]. The projectile is taken as CV chondrite [9], and crust as granite [G2 of 10], and averaged measured sections yield sediment volume fractions 0.568 calcite, 0.270 dolomite, 0.112 anhydrite, 0.036 sand, and 0.013 shale, significantly less sulfate than in [2]. The P-T path [Melosh, pers. comm.] is for an expanding vaporized dunite sphere.

For 90, 60, 45 and 30° impacts, vaporized target [5] and projectile [4] volumes are compared with previous work [1] in the figure inset. Increasing obliquity of impact increases the sediment component, resulting in a more oxidizing plume. For calculations illustrated here, it was assumed that vaporized material is homogeneously distributed in the plume, but maybe dynamic processes at scales not explored by the hydrodynamics codes [3] create very compositionally heterogeneous portions of the vapor plume. Relaxing the homogeneity assumption, we're investigating condensation of vapors compositions throughout the inset ternary, and with different sediment compositions.

K/T boundary spinel compositions [Kyte, pers. comm.], differ from Atlantic (low Mg, Al), to an Indian Ocean, to Pacific sites (high Mg, Al), perhaps reflecting spatial and temporal evolution of plume chemistry as the plume spread across the upper atmosphere, cooled, and precipitated spinel-bearing spherules. Calculated spinel composition trends (plotted) are relatively insensitive to obliquity. None is a "best fit" to the entire observed field. As T falls in the calculation, spinels become richer in ferric iron (Fe'''), so their compositions do not extend to the Fe'''-poor, Al-rich region.

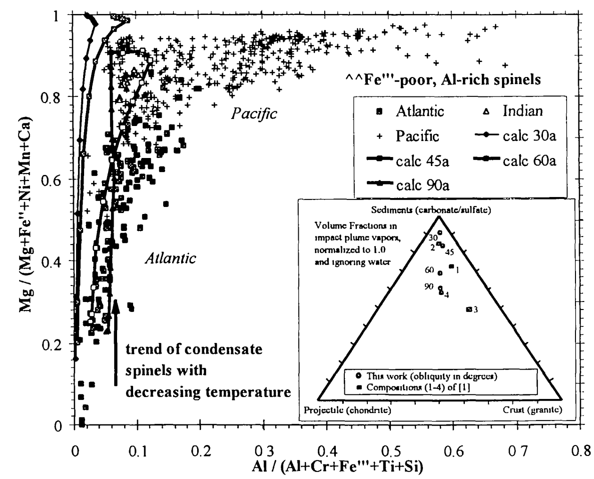

Fig. 1.

Conclusions: Atlantic spherules may record an early, higher T state of the plume. In that case, the Pacific spinels may record a later state of the plume. If so, then the plume chemistry was reduced in that later state, for some unknown reason. All calculated plume chemistries are simply too oxidizing to produce the Fe'''-poor, Al-rich spinels found in the Pacific sites.

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MICRO-DISTRIBUTION OF HALOGEN-DERIVED NOBLE GASES IN METEORITES. N. Ebisawa[1], R. Okazaki[1], K. Nagao[1], and A. Yamaguchi[2], [1]Laboratory for Earthquake Chemistry, Graduate School of Science, University of Tokyo, Hongo, Bunkyo-ku, Tokyo 113-0033, Japan (n-ebisaw@eqchem.s.u-tokyo.ac.jp), [2]Antarctic Meteorite Research Center, National Institute of Polar Research, Kaga, Itabashi-ku, Tokyo 173-8515, Japan.

Introduction: Micro-distribution of halogens in meteorites provides us with the information of interaction between aqueous fluids and minerals. However, the behavior of halogens in meteorites has never been solved owing to the difficulty of their microanalysis. A high sensitive mass spectrometer allows us to determine the small quantities of noble gases produced by decay of radioactive nuclide such as ^{129}I (half-life of 17 Myr) and neutron capture of ^{35}Cl, ^{38}Cl, ^{79}Br, ^{81}Br and ^{127}I. In addition, measurement of halogen-derived noble gases produced in space does not need to consider terrestrial