THE ISOLATED OLIVINE GRAIN POPULATION AND ACCRETIONARY RIMS OBSERVED IN TAGISH LAKE. [1]S. B. Simon and [1,2]L. Grossman, [1]Dept. Geophysical Sci., 5734 S. Ellis Ave., Univ. of Chicago, Chicago, IL 60637, USA. [2]Enrico Fermi Inst., Univ. of Chicago, Chicago, IL 60637, USA. (sbs8@midway.uchicago.edu)

Introduction: As part of a study of the anhydrous component of the Tagish Lake carbonaceous chondrite, we previously subjected ~ 1 g of material to freeze-thaw disaggregation and heavy liquid separation [1]. Many single crystals of olivine were recovered in the dense fraction, and it was found that the population has similarities to the composition distribution of olivine grains from CM chondrites while exhibiting differences with the population of grains from CIs. Disaggregation removes the grains from their petrographic setting, however, so we cannot be sure that the single crystals that were analyzed occurred in the meteorite as isolated grains. We have analyzed isolated grains *in situ* in polished chips of Tagish Lake to compare their compositions with those of previously analyzed single grains and with those of olivines from the various types of inclusions observed in the meteorite [1].

Results: The grains analyzed in the present study were randomly selected and are generally smaller than the hand-picked grains, which were probably biased toward larger grain sizes. The separated grains are dominated by forsterite having < 1 wt % FeO and 0.2-0.7 wt % CaO, with a trend from high-CaO, low-FeO compositions to ones with high FeO and low CaO. The *in situ* grains mostly have 0.8-2.0 wt % FeO and <0.3 wt % CaO, and most fall along the trend defined by the separates. Refractory forsterite [2] is present among both the *in situ* grains and the separates. No compositions typical of those from forsterite aggregates (both FeO and CaO contents <0.2 wt %) were observed among either the *in situ* grains or those from the separates. Unlike [1], however, we found MnO-rich forsterite in Tagish Lake, a feature that is more common in CIs than in CMs.

In Tagish Lake, most of the larger single crystals, as well as the chondrules and inclusions, exhibit fairly thick, fine-grained, phyllosilicate-rich rims, which we did not observe earlier because they are lost during the disaggregation process. They are important to note because all types of coarse-grained components of CM chondrites exhibit such rims, which have been interpreted as accretionary dust mantles [3]. The isolated grains found in CIs do not exhibit such rims [4]. Like those in CMs, the mantles in Tagish Lake have sharp contacts with their hosts and consist of a variety of anhydrous mineral clasts enclosed in phyllosilicates. They also have bulk compositions similar to the CM rims documented by [3].

Discussion: Tagish Lake exhibits some features of CIs and some associated with CMs. With respect to the anhydrous component, the parallels with the CMs are much stronger. The presence of chondrules and refractory inclusions [1,5] and the compositional overlap among the isolated olivine populations of CMs and Tagish Lake reflect formation from similar primary petrologic components. The phyllosilicate mantles on many of these objects further suggest that the clasts had nebular histories similar to that inferred by [3] for the CM precursors, with formation, fragmentation, alteration and rimming preceding accretion into the parent body. If this is true, then one difference between Tagish Lake and the CMs would be that Tagish Lake incorporated chondrules and inclusions that were already more heavily altered than those incorporated by the CMs.

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