# Striking Graphite Bearing Clasts Found in Two Ordinary Chondrite Samples; NWA6169 & NWA8330

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Meteorites play an integral role in understanding the history of the solar system. Not only can they contain some of the oldest material found in the solar system they also can contain material that is unique. Many lithologies are only found as foreign clasts within distinctly different host meteorites. In this investigation two foreign clasts within the meteorites, NWA6169 and NWA8330 were studied. The purpose of this investigation was to examine the mineralogy and petrography of the clasts within the samples. From there an identification and possible origin were to be inferred.

NWA6169 is an unclassified ordinary chondrite that has a presumed petrologic type of L3. NWA8330 is a classified ordinary chondrite that has a petrologic type of LL3. Both meteorites were found to contain clasts that were similar; both modally were comprised of about 5% acicular graphite. Through SEM and Raman Spectroscopy it was found that they contained olivine, pyroxene, plagioclase, Fe-Ni sulfides, graphite, and metals. They were found to portray an igneous texture with relationships that suggest concurrent growth. Analytical microprobe results for NWA6169 revealed mineral compositions of $Fa_{31-34}$, $Fs_{23-83}$, and $Ab_{7-85}$. For NWA8330 these were $Fa_{28-32}$, $Fs_{10-24}$, and $Ab_{4-83.}$

Only one similar material has been reported, in the L3 chondrite Krymka (Semenenko & Girich, 1995). The clast they described exhibited similar mineralogies including the unusual graphite. Krymka data displayed compositional values of $Fa_{28.5-35.0}$ and $Fs_{9-25.9}$. These ranges are fairly similar to that of NWA6169 and NWA8330. These samples may all be melt clasts, probably of impact origin. Two possibilities are (1) impact of a C-type asteroid onto the L chondrite parent asteroid, and (2) a piece of proto-earth ejected from the moon-forming collision event. These possibilities present abundant questions, and can be tested. The measurement of oxygen isotope compositions from the clasts should reveal the original source of the melt clasts. It may also be possible to perform Ar dating of the plagioclase present. Former analyses are now being performed.

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