

Revisiting the details of the link between the Tagish Lake meteorite and the D asteroids

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Last year, my research team reported (Hiroi et al. 2001) that the Tagish Lake meteorite, a unique carbonaceous chondrite, was likely to have come from a D asteroid based on their visible and near-infrared reflectance spectra. Because the Tagish Lake meteorite is such a special meteorite being one of the oldest materials in our solar system, many investigators and general public have high interests in its nature and origin. I feel responsible to report the details of the link between Tagish Lake and D asteroids for people to check how sure their link is and what other possibilities exist. I am presenting new measurements of reflectance spectra of Tagish Lake meteorite sample with higher quality and more viewing geometries in order to compare them with asteroid spectra better.

Because Tagish Lake is such a dark (2 %) meteorite, the change of brightness and color due to geometry change is relatively large compared with other brighter materials, requiring more precise treatment of non-Lambertian nature of the standard reference material for reflectance spectral measurements. Because asteroidal observations are generally made at much smaller phase angle than the laboratory measurements, such an analysis is indispensable. Here, I attempt to measure Tagish Lake sample at the closest possible phase angle to the D asteroids to compare their brightness and color more reliably.

References:

T. Hiroi, M. E. Zolensky, and C. M. Pieters (2001) The Tagish Lake meteorite: A possible sample from a D-type asteroid. *Science* 293, 2234-2236.