

PETROGRAPHIC CLASSIFICATION AND CHONDRULE TEXTURES OF FOSSIL METEORITES FROM SOUTHERN SWEDEN.

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Over 12 separate fossil meteorite falls have been identified in the mid-Ordovician limestone of Thorsberg, southern Sweden [1, 2]. Their affinity to L chondrites has been suggested through chemical analyses of relict chromite grains. Here we start extending the classification of the samples to provide petrographic types.

In order to do this we have determined the abundance and grain size of chromite grains within fossil meteorites and compared the results with similar counts on recent meteorites. The counts and measurements on the fossil meteorite blocks were done with a low-vacuum chamber analytical SEM. We have also recorded the relict chondrule textures.

Chromite is the only mineral phase that has been preserved with its initial meteoritic chemistry during the diagenesis of the fossil meteorites. However in some samples there has also been near perfect pseudomorphing of chondrule textures, and where possible this has also been used for determining petrographic type. Ordinary chondrites contain progressively higher abundance of coarser sized chromite grains with increasing petrographic type. Three of the recent meteorites of lower petrographic type used in our comparative study are Parnallee (LL3.6), Floyd (L4) and Julesburg (L3.7). Higher petrographic type OCs studied include Dhurmsala (LL6) and New Concord (L6).

Julesburg has a mean chromite grain size of 10 μ m, range 5-50 μ m; Floyd has mean = 50 μ m, range = 10-150 μ m. On the basis of chromite measurements we suggest the following petrographic types: Ark032 (mean = 50 μ m) type 4 or 5; Ark003 (mean = 90 μ m) type 5 or 6; Ark010 (mean = 20 μ m) type 3; Skj001 (mean = 35 μ m) type 4 or 5; Sext001 (mean = 40 μ m) type 4 or 5. See [1] for meteorite names and distribution. The classification of Ark010 as a relict L3 chondrite is supported by its preserved chondrule outlines and textures. Chondrule textures in the samples (pseudomorphed by carbonate and barytes) include radiating-pyroxene, porphyritic and barred textures.

Our results suggest that the Middle Ordovician meteorite falls preserved in southern Sweden consist of a range of petrographic types from 3 to 5/6.

References: [1] Schmitz B. et al. 2001. *Earth Planet. Sci. Lett.* 194:1-15. [2] Schmitz B. et al. 2001. *Meteoritics & Planetary Science* 36: A183.