

Anomalous Na contents in EET90299 chondrules mesostasis

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Genetic relationship among E-chondrites are still poorly understood. So, firstly, we began to investigate the geochemical relationship between mesostasis and crystalline phases in chondrules of different E-chondrite types.

EET90299 is an unequilibrated enstatite chondrite (EL3) [1]. A thin section of EET90299 showed the occurrence of several chondrules in a range of 400 to 2000 μm in size. Five chondrules were selected from this section, on the base of microstructural features [2].

As it can be seen in fig.1, EET90299 chondrules showed a strong albitic-normative mesostasis. Those results were plotted with other analyses on chondrule mesostasis that occurred in EL3 chondrites, (ALH85119, PCA91020, MAC88180) Schneider *et al* (2002) [3].

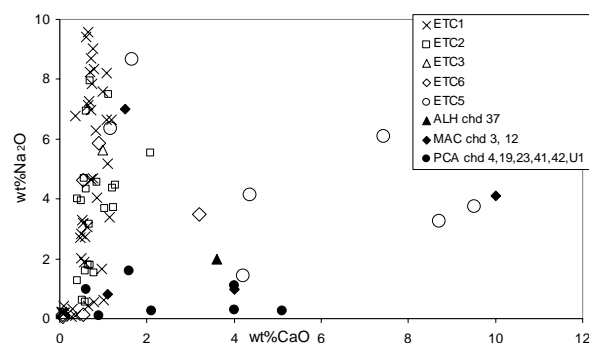


Figure 1. Na_2O vs. CaO in EL3 chondrule mesostasis: this work (open symbol) and Schneider *et al.*, 2002 (closed symbol).

We find Na-plagioclase composition for all the chondrule mesostasis except for one that shows a more anorthitic composition. These features stand between EH3 and EL3 type chondrule mesostasis, following Schneider *et alii* scenario. It could mean that the difference in chemical compositions could reflect local variations in the nebular environment, or that EET90299 underwent a more rapid cooling. However, other investigations are in progress on other chondrules from this thin section to compare them with EH3 chondrules.

- [1] Grossman J.N.(1994), *Meteoritics*, **29**, 1, 100-143;
[2] Manzari *et al.* (2008), *33rd Geological Congress,Oslo*;
[3] Schneider *et al.* (2002), *M&PS*, **37**, 1401-1416.

Characterization of competitive binding of Eu(III)/Cu(II) and Eu(III)/Ca(II) to Gorleben humic acid

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In an area that contains high concentrations of natural organic matter, it is expected to play an important role on the speciation of trivalent radionuclides. Competitive interactions with H^+ and major cations, *e.g.* Ca^{2+} or Mg^{2+} , could influence these metals transport and bioavailability. Competitive experiments between Eu^{3+} and cations which can bind differently to humic substances, would bring an improved understanding of the competitive mechanisms. The aim of this study is to acquire data for Eu(III)/Cu(II) and Eu(III)/Ca(II) competitive binding to a sedimentary-originated humic acid (Gorleben, Germany). The NICA-Donnan parameters [1] for Ca(II) , Cu(II) , and Eu(III) obtained from competitive binding experiments using Ca^{2+} or Cu^{2+} ion selective electrodes (ISE), were used to model time-resolved luminescence spectroscopy (TRLS) measurements. Then the TRL spectra and decay times were interpreted to check the consistency of the modelling. From ISE data, Eu(III) and Cu(II) are in direct competition for the same type of sites, whereas Ca(II) has an indirect influence through electrostatic binding. The spectroscopic interpretation of the competition experiments showed two strikingly different environments for the Eu(III)/Cu(II) and Eu(III)/Ca(II) systems. Cu(II) seems to expel more effectively Eu(III) into an aqueous like environment within the humic acid structure, *i.e.*, the Donnan phase, and to the aqueous phase as free Eu^{3+} . This is evidenced both from the spectra as well as from the decrease in the luminescence decay times. Moreover, Ca(II) causes a slighter modification of the chemical environment of the humic-complexed Eu(III) .

- [1] Kinniburgh *et al.* (1999) *Colloids Surf. A* **151**, 147-166.