

ZONING IN K/T BOUNDARY SPINEL. L. Ferriere¹ and E. Robin². ¹LEME, Muséum National d'Histoire Naturelle, Paris (France). E-mail: ferriere@mnhn.fr. ²LSCE, CEA, Gif sur Yvette (France).

Introduction: Previous studies have revealed the existence of Ni-rich spinel crystals in K/T boundary clays [1,2]. K/T spinel is characterized by a high Ni²⁺ and Fe³⁺ content and also contains Fe²⁺, Mg²⁺, Al³⁺ and Cr³⁺ with abundances varying from site to site [3]. It has been shown that the composition of spinel depends primarily on ambient oxygen fugacity and the initial composition of the crystallizing material [4,5].

Here we report the compositional zoning in K/T boundary spinel from Bidart (France) and Caravaca (Spain). X-ray maps and compositional profiles were performed by EDS on a JEOL JSM 840.

Results: We found a tenth of the crystals with compositional zoning from core to rim. These have a Cr-rich (Cr₂O₃ ~14-18 wt%) and Fe-poor (Fe₂O₃ ~ 48-52 wt%) core with respect to a Cr-poor (Cr₂O₃ ~4-8 wt%) and Fe-rich (Fe₂O₃ ~ 60-64wt%) rim. The core is also slightly depleted in Ni and Ti and enriched in Al and Mg, and has a lower Fe³⁺/Fe_{total} ratio. The contact between the Cr-rich core and the Fe-rich rim is very well defined.

Discussion: Ni depletion in the core indicates that the zonation is primary rather than the result of alteration. The variation of the Fe³⁺/Fe_{total} ratio from core to rim may indicate oxygen fugacity (f_{O₂}) increase during crystallization, accounting for reduced chromite precipitation at low f_{O₂} with subsequent magnetite overgrowth at higher f_{O₂}. Alternately, it may reflect the presence of relic chromite with subsequent magnetite overgrowth. Relic chromite with similar magnetite overgrowth has been reported in experimental melting of meteorites [5]. Oxygen isotopic analyses on a CAMECA NanoSIMS 50 are currently in progress.

References: [1] Montanari A. et al. 1983. *Geology* 11:668-671. [2] Smit J. and KYTE F. T. 1984. *Nature* 310:403-405. [3] Robin E. et al. 1999. Abstract #1601. 30th Lunar & Planetary Science Conference. [4] Gayraud J. et al. 1996. *Geol. Soc. Amer. Spec. Paper* 307:425-443. [5] Gayraud J. 1995. PhD of the Univ. of Paris-sud, Orsay, France, 301p.

